ALSTOM

Genrakode II™ CAA

User Manual

Genrakode II™ CAA User Manual
P2160C

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User Manual

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P2160C

REVISION LOG

Date Mo/Year	Description	TP&T Rep.	Project Manager Name	Project Manager Date	Project Engineer Name	Project Engineer Date
Nov. 1997	Initial Release	JMF				

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SECTION 1

ATTENTION

GENERAL

This is a vital safety software program which processes logic equations to develop a fail-safe system. **No** user modification of the Genrakode II™ Computer Aided Application (*PGK CAA*) is permitted as ANY PROGRAM CHANGE could compromise the safety of the system.

The responsibility for the underlying safety of the data input belongs to the user. The user is responsible for verifying that the code and aspect control equations developed with the program describe the intended operation of the application in a fail-safe manner.

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SECTION 2

PROGRAMMABLE GENRAKODE OVERVIEW

INTRODUCTION

Genrakode II™ is the second generation of Genrakode™ microprocessor-based equipment for train detection, vital communication through the rails, and cab signaling. It is distinguished from the original Genrakode product by the central processing unit (CPU) board. Genrakode modules now house the programmable Genrakode II™ (PGK) CPU board as a drop-in replacement for the original Genrakode product's CPU board. As such, Genrakode II™ provides all the features and functionality of Genrakode with the added flexibility of application and configuration programmability, and built-in data logging.

The Genrakode II™ CPU is configured and programmed with the Genrakode II™ Computer Aided Application (CAA). The Genrakode II™ CAA, hereafter referred to as the PGK CAA, is a Microsoft® Windows™ based software tool designed to facilitate the implementation of Genrakode applications by signal engineers.

PGK CAA Overview

The PGK CAA is comprised of an equation editor, a compiler and a download program. The equation editor is used to create and modify application logic and specify module configuration parameters. Application logic and configuration information are saved as .PGK files. Information contained in .PGK files is only usable by the PGK CAA for editing and design. For a configured application contained in the .PGK file to function in a Genrakode™ module, it must be compiled by the PGK CAA compiler into the .HEX file format. When the data contained in the .HEX file is verified, it can be downloaded to the PGK CPU using the download program provided with the PGK CAA.

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SECTION 3

ABOUT THIS DOCUMENT

GENERAL

This document is designed to be a user's manual for the PGK CAA. It provides a step-by-step guide to installing and using the CAA to create and download an application. It also includes a Reference section which describes functions not covered directly in the Section 5 Creating an Application and a Glossary which defines frequently used or possibly unfamiliar terms.

The text formatting conventions listed below are followed throughout this document:

bold - keyboard keys, menu names, button names
italic - window names
bold italic - terms found in the glossary
underlined - window data fields which require user-entered data
underlined italic - window data field options

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SECTION 4

INSTALLATION INSTRUCTIONS

GENERAL

The PGK CAA has an automatic setup facility for ease of installation. You are prompted for the components you want installed and the hard drive directory location where they will reside. The setup procedure then installs some or all of the following files based upon the selected options:

I. Compiler executables and documentation
   - A. The PGK CAA editor/compiler executable file, *pgkcaa32.exe*.
   - B. Library files, *ctrl_pt.lib, intrmed.lib,* and *repeater.lib*, needed for generation of the downloadable .HEX file.
   - C. The system software file required by the current version of the PGK CAA.
   - D. A configuration file, *pgkcaa32.ini*.
   - E. The PGK CAA help file, *pgkcaa32.hlp*.
   - F. The PGK CAA User's Tutorial and supporting files (*pgkdemo.dbd, demo32.exe, ds32.dll*).

II. Download program for DOS
   - A. A DOS-based program, *dload.exe*, which handles the downloading of application .HEX files to the Genrakode™ module. This program also works as a simple terminal emulator.
   - B. The download program's help file, *dload.hep*.
   - C. The system software file required by the current version of the PGK CAA.

III. Program manager group and icons for Download
   - A. Sets up a Windows Program Manager group (or Start menu option), *Genrakode II™ CAA*, and an icon for the download program if they do not already exist.

SYSTEM REQUIREMENTS

PGK CAA Minimum Requirements

1. Windows 95™, Windows NT™, or Windows 3.1™ with Win32s™ version 1.30 (Win32s is supplied with the PGK CAA).
2. 3.5 MB of hard disk space.
3. Intel 386 20 MHz (or equivalent) for Windows 3.1, or Intel 486 66 MHz (or equivalent) for Windows 95 or Windows NT.
4. 6 Mb RAM for Windows 3.1 or 16 Mb RAM for Windows 95 or Windows NT
5. Windows-compatible mouse (recommended but not required)

Genrakode II™ Download Minimum Requirements

1. DOS version 3.1 or later.
2. Intel 286 16 MHz.
3. 630 Kb RAM
4. Serial Port

INSTALLING THE SOFTWARE

Installing the Genrakode II™ CAA

1. Insert the disk labeled *Genrakode II™ CAA Version 1.0 Install Disk 1* into the drive.
2. In the Program Manager, click on the **File** menu and choose **Run** (or click on the **Start** button and choose **Run**). A *Run* dialog box appears.
3. Type *A:\setup* in the command line field, where *A* is the letter of the drive containing the installation disk.
4. Follow the instructions displayed by the *Setup* program. This will install the software based on the options chosen. Note that the Serial Number required in the *User Information* screen appears on the label of Disk 1.
5. If the PGK CAA is being installed on a machine that is running Microsoft Windows version 3.1 and does not already have Microsoft Win32s version 1.30 or later installed, then Win32s version 1.30 will be installed automatically.

Installing the DOS Download Program to a floppy disk

The DOS download program can be copied to a floppy disk to distribute with application .HEX files or to use on systems that are not equipped with Windows 3.1 (see PGK Download Minimum Requirements). To install only the download program, follow the instructions for a regular setup, but:

1. On the *Setup Type* screen select *Custom*.
2. On the *Select Components* screen, select only *Download Program for DOS.*

RUNNING THE SOFTWARE

To run the PGK CAA, double click on the **Programmable Genrakode CAA *icon*** in the *Programmable Genrakode* program group (or click on the Start button, choose Genrakode II CAA from the Programs and click on Genrakode II Computer Aided Application).

To run the DOS download program from Windows, double click on the **PGK CAA Download** icon in the *Programmable Genrakode* program group group (or click on the Start button, choose Genrakode II CAA from the Programs and click on Genrakode II Hex File Download).

To run the DOS download program from a DOS prompt type **dload** from the directory where the download program was installed. For a complete list of command line arguments, type **dload -h**.

SECTION 5

CREATING AN APPLICATION

GENERAL

This section covers the basic steps of creating a Programmable Genrakode application. It assumes knowledge of Windows commands (e.g. “click”, “double click”, “right click”, “toolbar”, “menu”). See the Section 9 Basic Windows Terms and Functions if you are unfamiliar with these terms or operations.

THE PGK CAA WINDOW

Figure 5-1 shows the *Programmable Genrakode CAA* window as it appears when the CAA is first started. Editing functions are performed in smaller ***child windows*** which appear within *Programmable Genrakode CAA* window. Menus become visible and toolbar buttons are enabled as their functions are needed.

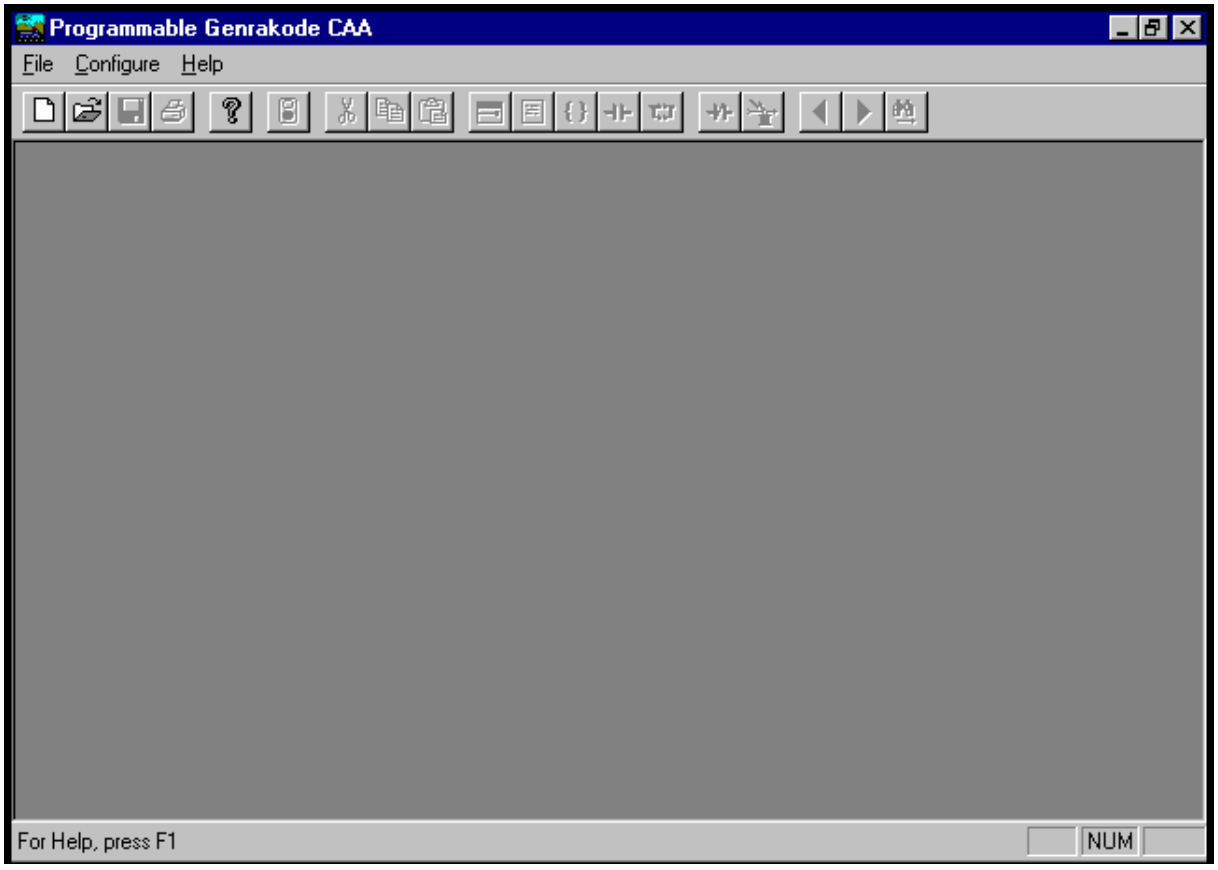

Figure 5-1. PGK CAA With No Open Application

STARTING A NEW APPLICATION

To create a new application, create a new .PGK file.

To create a new PGK file:

Click the **New** toolbar button

OR
Click on the **File** menu and choose **New.**

Then choose the desired module type: Control Point, Intermediate or Repeater (shown in Figure 5-2).

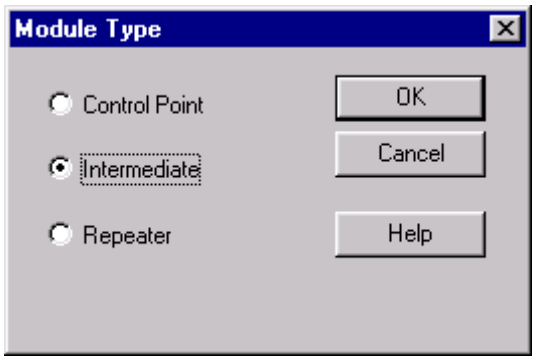

Figure 5-2. Module Type Dialog Box

THE CONFIGURATION WINDOW

Each application has an associated *Configuration* window that appears after the module type has been selected for a new application or when an existing application is loaded. This window displays the application documentation, the module configuration associated with the application, and a list of the current compiler settings. The Configuration window localizes information that is set elsewhere. Data cannot be edited here. The *Configuration* window displayed for a newly created Intermediate application is shown in Figure 5-3.

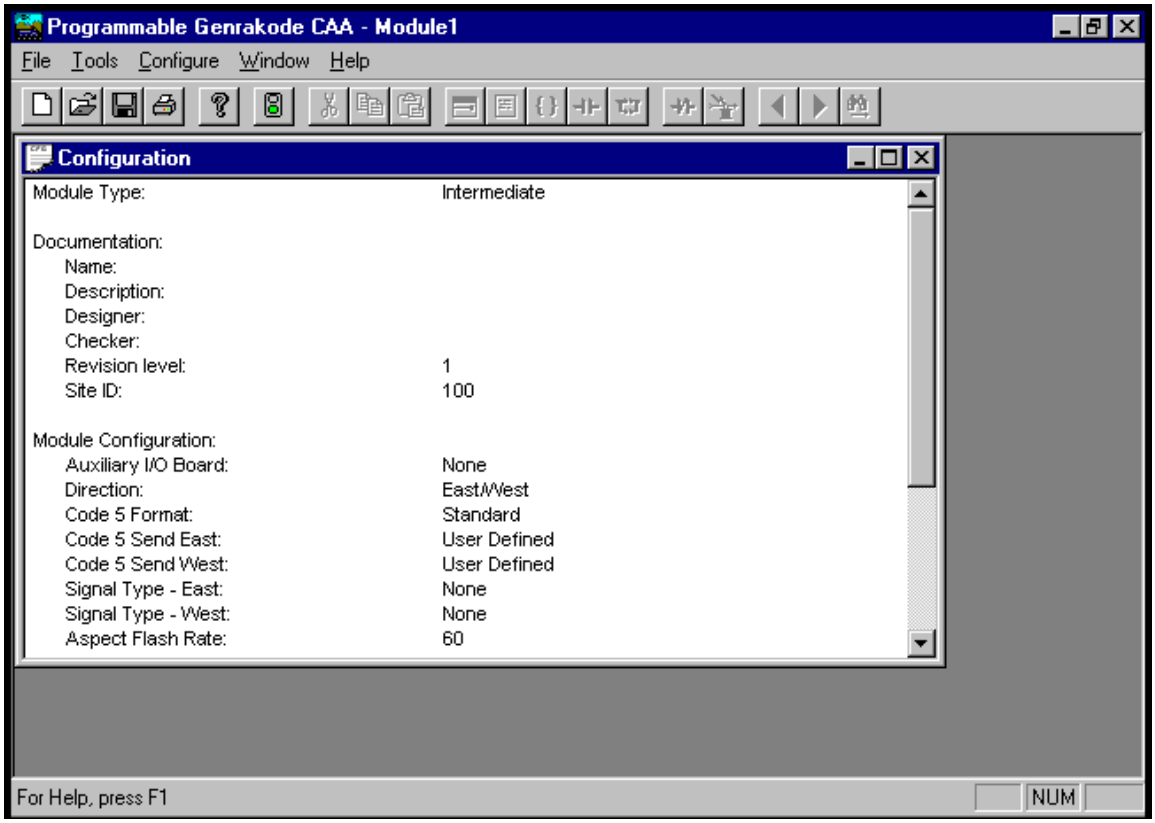

Figure 5-3. Configuration Window of a New Intermediate Application

The Documentation section initially appears empty (with the exception of the Revision level and Site ID which take on their default values). The Module Configuration section displays the defaults associated with each characteristic. Scrolling down the *Configuration* window reveals the Run Controls settings.

THE TOOLS MENU

Clicking on the Tools menu shows the major editable components of the application. The contents of the menu are displayed in Figure 5-4. The options are discussed individually in future sections.

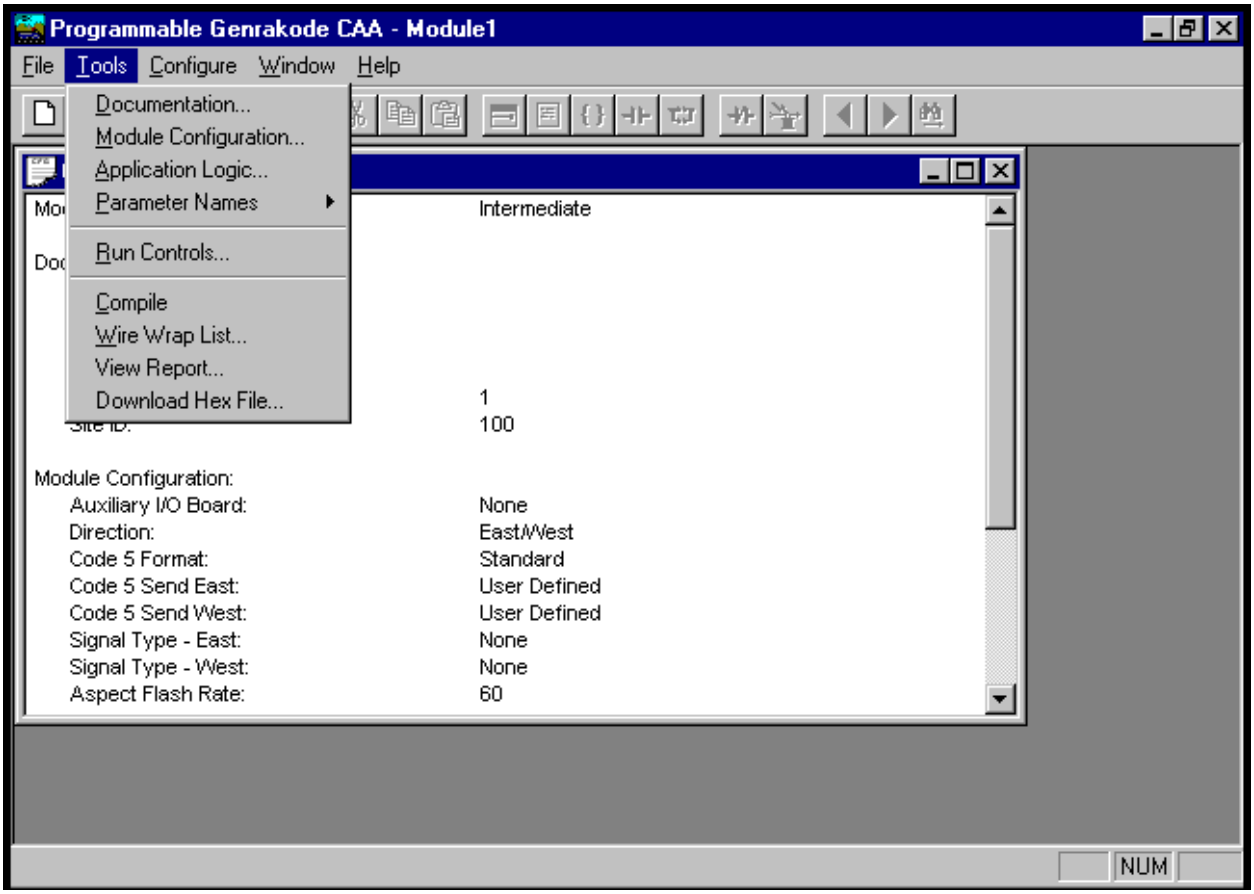

Figure 5-4. Tools Menu

EDITING DOCUMENTATION

The Documentation section should be edited first. Information contained here allows for tracking applications through the various stages of development and revision.

To edit the documentation data:
1. Click on the **Tools** menu.
2. Choose **Documentation**.

Enter the appropriate data in each field of the *Documentation* window.
An example is shown in Figure 5-5.
The field contents are described on the next page.

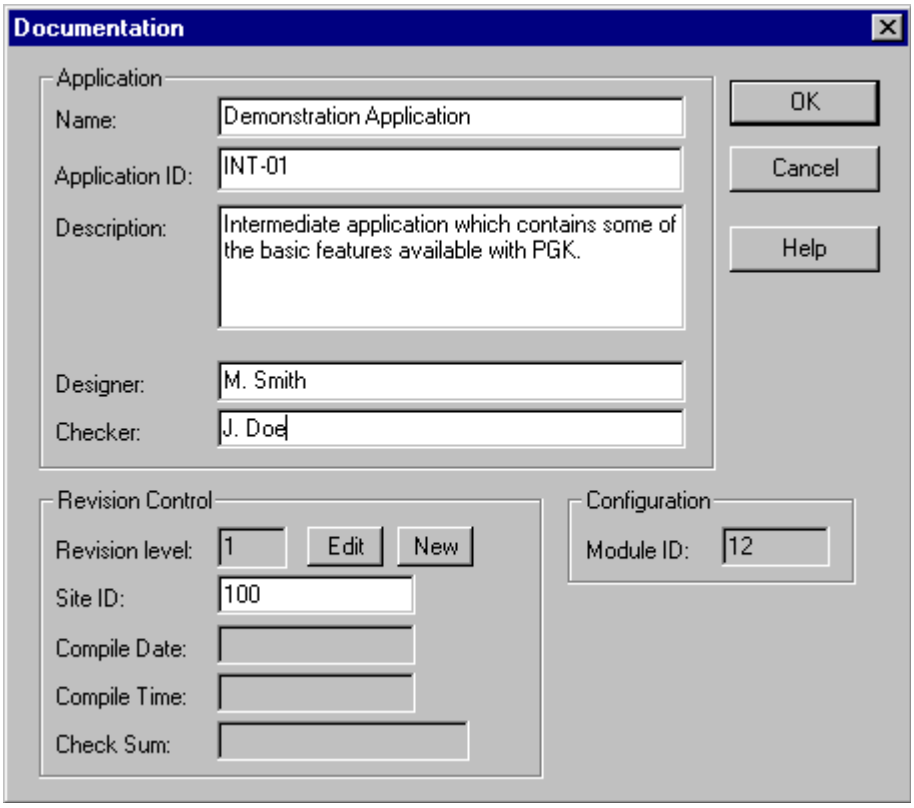

Figure 5-5. Completed Documentation Window

Field Contents:

Name	Unique, possibly descriptive name of the application.
Application ID	Unique alphanumeric identification for the application. This could correspond to a departmental numbering system or other archival process.
Description	Possible uses include: a summary of the main components of the application, a note about a unique application feature, or general comments.
Designer	The person designing the application.
Checker	A person, DIFFERENT from the Designer, who verifies that the logic entered by the Designer accurately describes the intended application.

NOTE: The above fields DO NOT affect the functionality of the system in any way.

Unlike the fields discussed above the Revision level and Site ID values DO affect the functionality of the system. Each Revision level and Site ID value combination corresponds to a unique set of jumpers which must be wire-wrapped on the back of the Genrakode™ module. If the correct jumpers are not wire-wrapped, the module does not function. This allows the designer a level of protection against an application functioning at an unintended site.

Revision Level

The current revision of the application. Every time an application is modified, the revision number should be incremented by clicking on the **New** button. This signifies that the application has been edited and its functionality has changed from the previous revision. Changing the revision number changes the required jumper settings. Each revision has an area for comments. Information entered here should describe changes made to the application from its previous revision. To edit the comment of the CURRENT revision, click on the **Edit** button in the Revision Control section of the *Documentation* window (see Figure 5-5). To create a new revision and edit its comment, click on the **New** button in the Revision Control section of the *Documentation* window. A sample is shown in Figure 5-6.

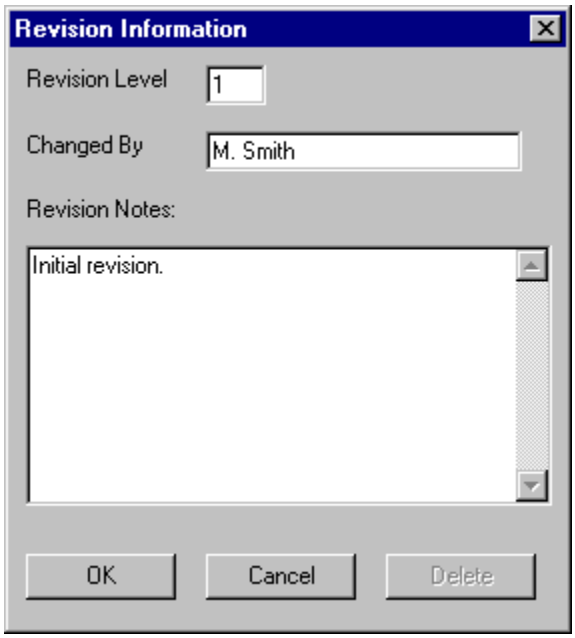

Figure 5-6. Completed Revision Information Window

Site ID

Identification number of the location where the application will be installed. The numbers should correspond to an internally defined system, which assigns numbers to locations along the tracks. For example, the Site ID could be the same for logically identical applications functioning in consecutive Intermediate modules, but would change at consecutive Control Point modules. Changing this value changes the required jumper settings.

Compile Date

Updated automatically by the CAA every time the application is compiled.

Compile Time

Updated automatically by the CAA every time the application is compiled.

Check Sum

A four-digit hexadecimal number calculated by the CAA based upon the data in the compiled application. This value is filled in automatically every time the application is compiled. This value will also be displayed by the download program after the application is successfully downloaded to a module.

Module ID

This field is also maintained by the CAA. The value that appears here is determined by the selected module configuration. It is used internally by the CAA for data verification. There is a unique value for every possible combination of vital module configuration parameters.

When the documentation is complete, click on the **OK** button and the entered information is updated in the *Configuration* window (see Figure 5-7).

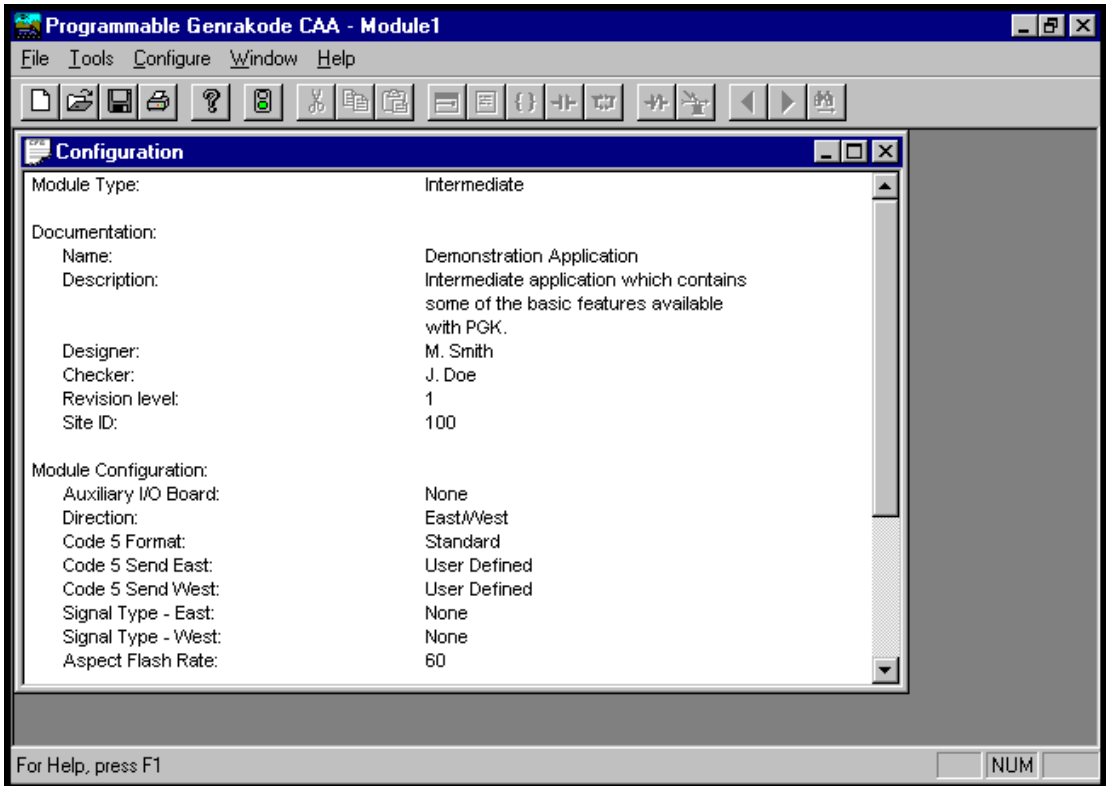

Figure 5-7. Configuration Window After Modifications to the Documentation.

CONFIGURING THE MODULE

Configuring a module specifies the vital system components needed for the application. The *Module Configuration* windows for each module type appear below.

To modify the configuration:
1. Click on the **Tools** menu.
2. Choose **Module Configuration**.

Figure 5-8, 5-9, or 5-10 will appear depending on the module type associated with the application.

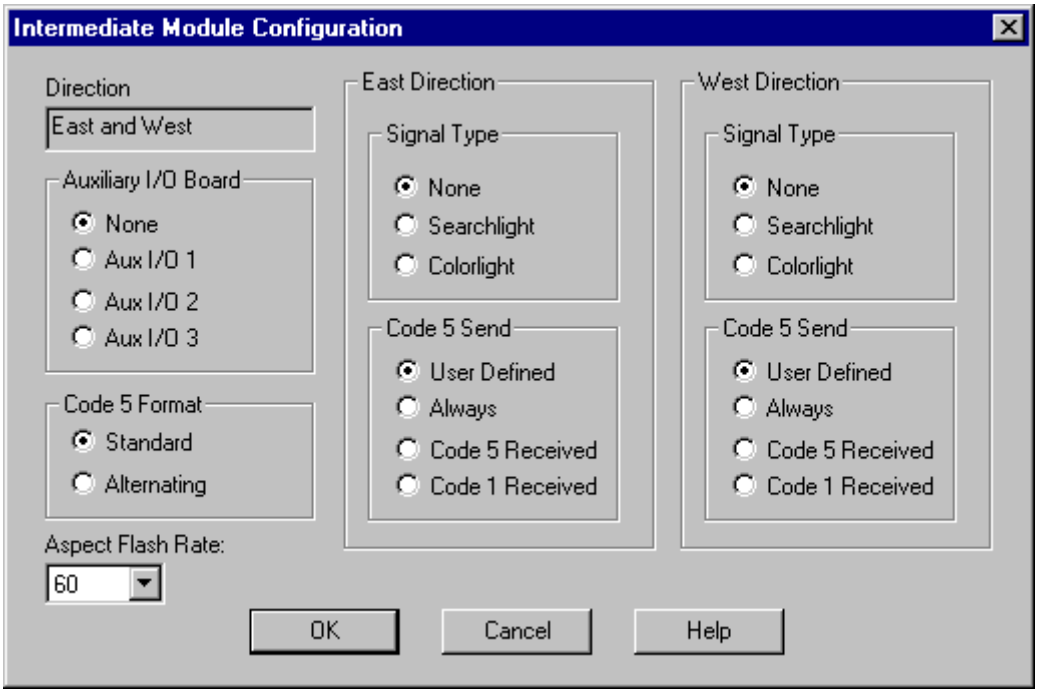

Figure 5-8. Default Settings for an Intermediate Module Configuration

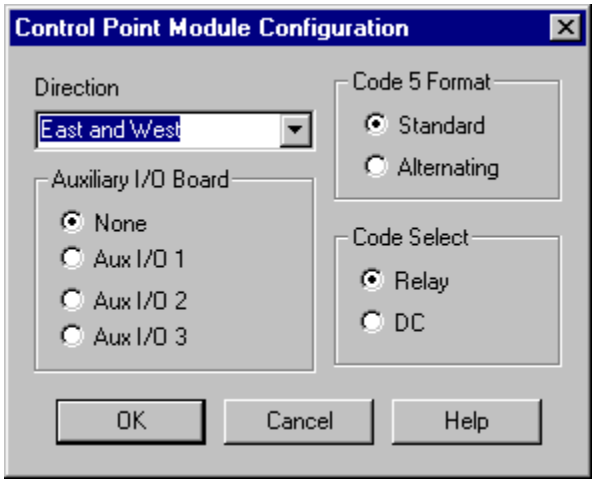

Figure 5-9. Default Settings for a Control Point Module Configuration

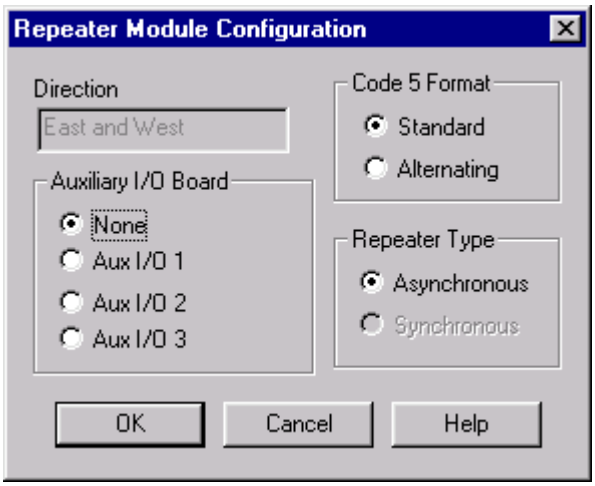

Figure 5-10. Default Settings for a Repeater Module Configuration

Update the configuration settings as required.
When the configuration is complete, click on the **OK** button and the Module Configuration section of the *Configuration* window is updated to reflect the changes (see Figure 5-11).

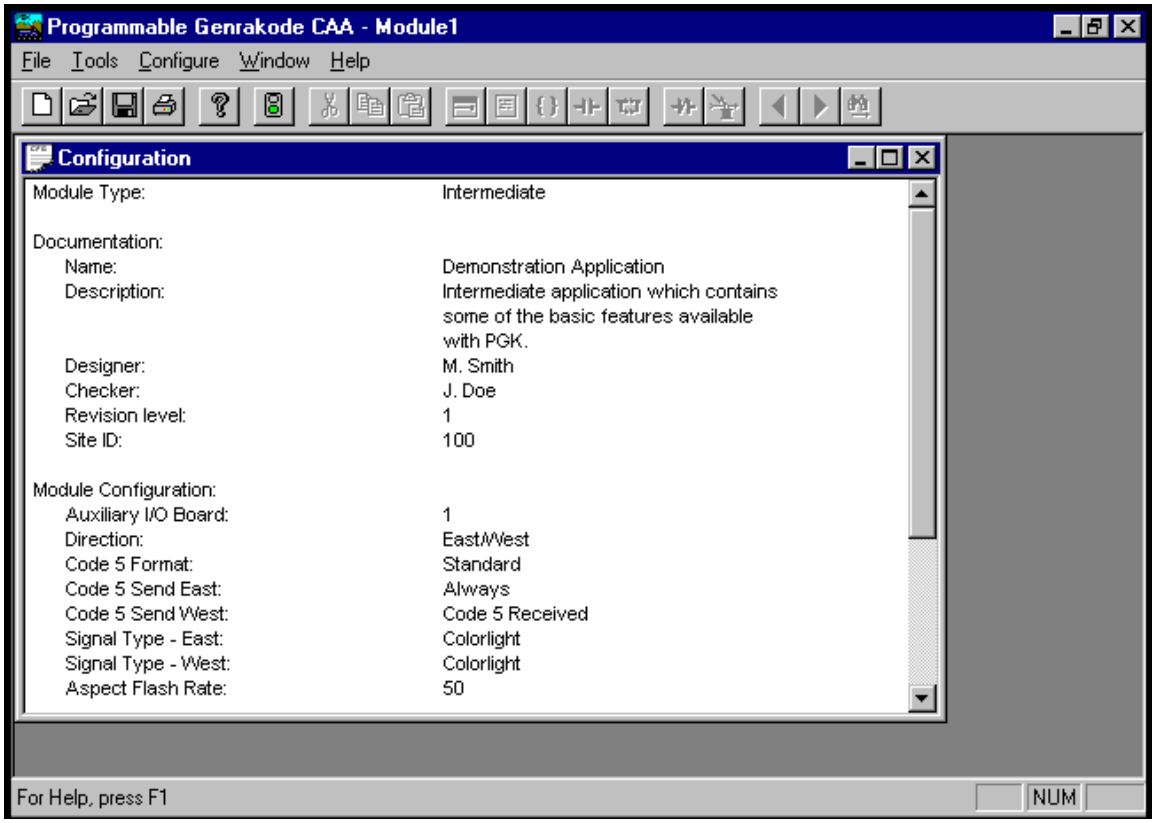

Figure 5-11. Configuration Window After Modifications to the Module Configuration.

EDITING THE APPLICATION LOGIC

The following example shows the creation of an arbitrary Intermediate color-light application. The logic dictates the functionality of the configured module.

To display the logic editing window:
1. Click on the **Tools** menu.
2. Choose **Application Logic**.

The *Logic* window appears overlapping the *Configuration* window (see Figure 5-12).

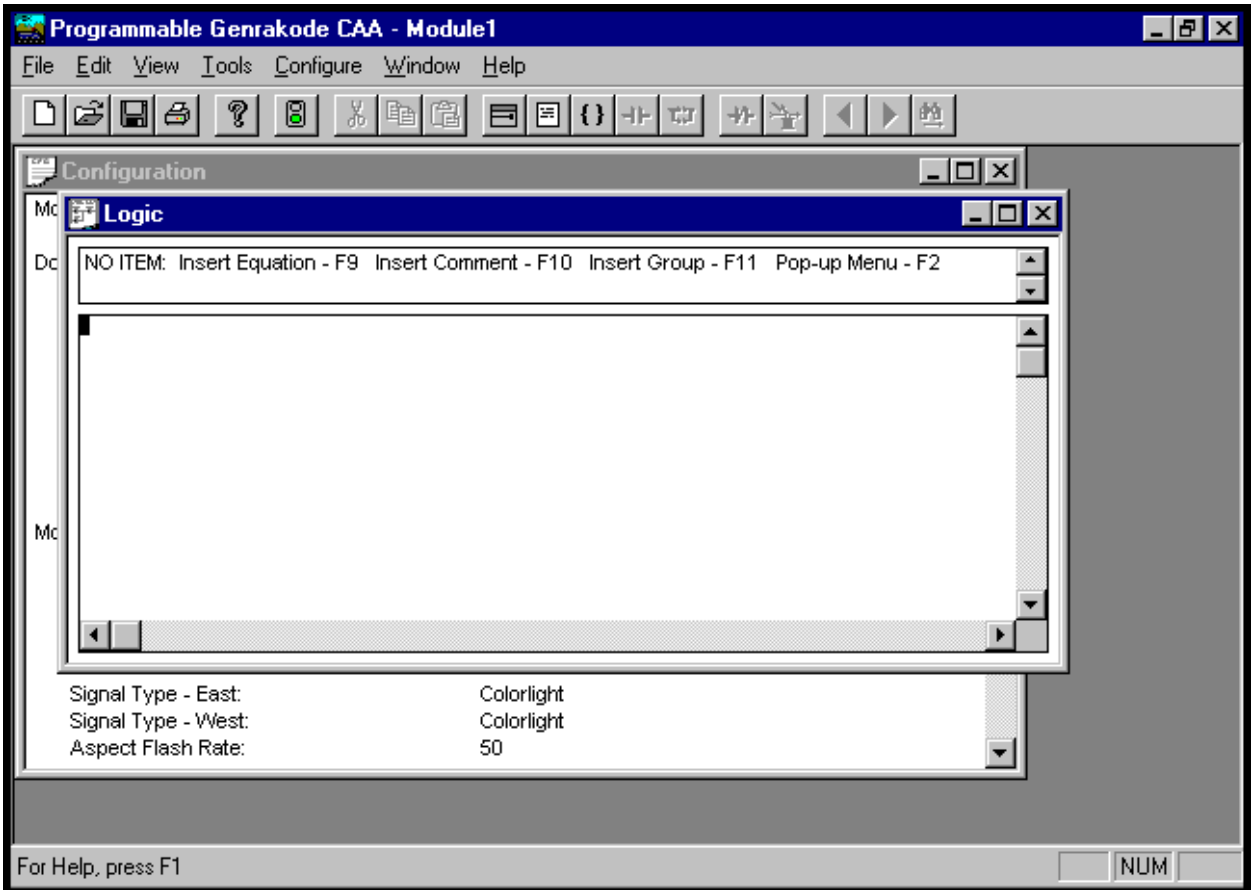
Programmable Genrakode CAA - Module1
File Edit View Tools Configure Window Help
Configuration
Logic
NO ITEM: Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Pop-up Menu - F2
Signal Type - East: Colorlight
Signal Type - West: Colorlight
Aspect Flash Rate: 50
For Help, press F1
NUM

Figure 5-12. Logic Window Added

Application logic is designed by entering Equations. Comments and Groups help organize the application logic. Comments, Groups and Equations are inserted at the location of the cursor by accessing buttons on the toolbar. Initially, the cursor appears as a small black rectangle in the upper left-hand corner of the *Logic* window (see Figure 5-13). The cursor can be moved to a new location by using the arrow keys on the PC keyboard or by clicking on the new location with the LEFT mouse button.

The action window, which appears above the *logic* window, displays the available functions based on the current location of the cursor (see Figure 5-13). The capitalized term is the object type upon which the cursor rests. For example, in Figure 5-13, the cursor rests over NO ITEM, and in that location a group, comment or equation can be inserted.

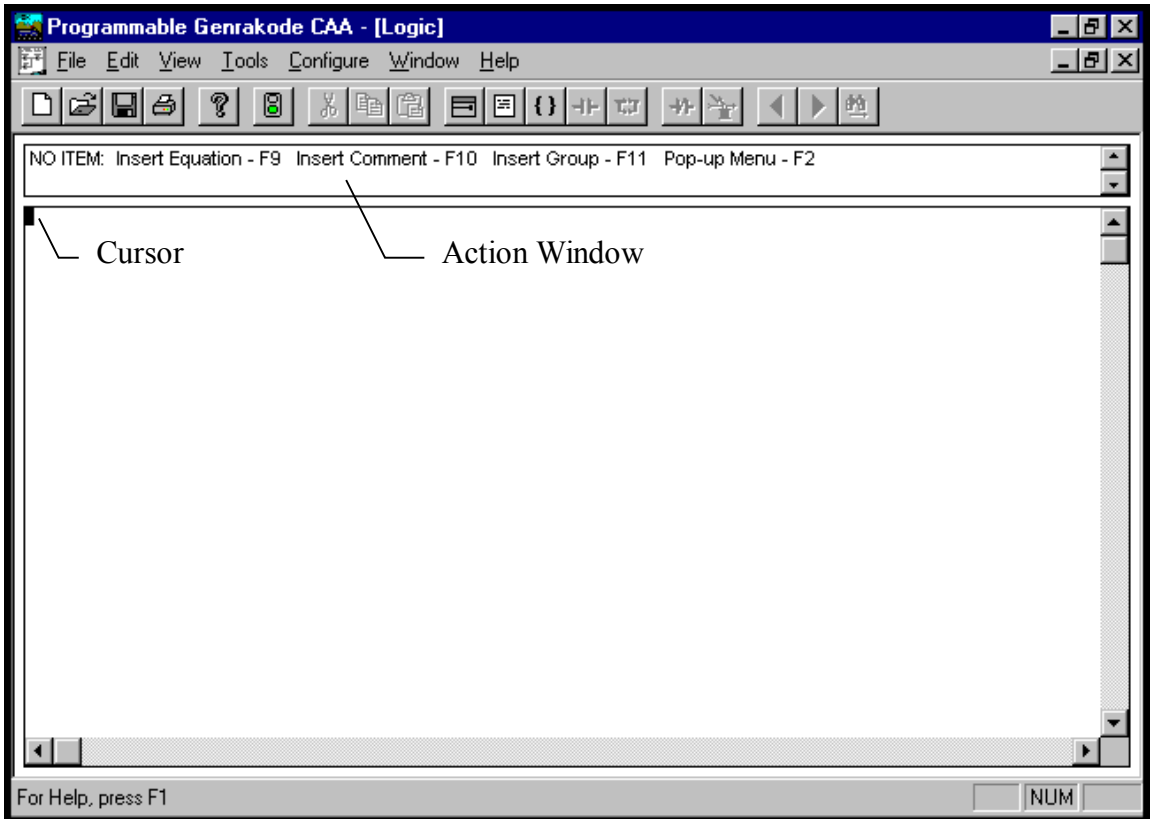
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
NO ITEM: Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Pop-up Menu - F2
Cursor
Action Window
For Help, press F1
NUM

Figure 5-13. Maximized Logic Window With Rectangular Cursor

Inserting A Comment

It is good practice to comment application logic. Comments provide a means of documenting revisions, functional description, and logic structure.

To insert a comment:

	OR	OR
1. Click at the location in the *Logic* window where the comment is to be inserted.	1. Click at the location in the *Logic* window where the comment is to be inserted.	1. Right click at the location in the *Logic* window where the comment is to be inserted.
2. Click the **Insert Comment** button on the toolbar.	2. Press the **<F10>** key.	2. Choose **Insert Comment** from the pop-up menu.

The *Program Comment* window appears (see Figure 5-14). Type the comment here.

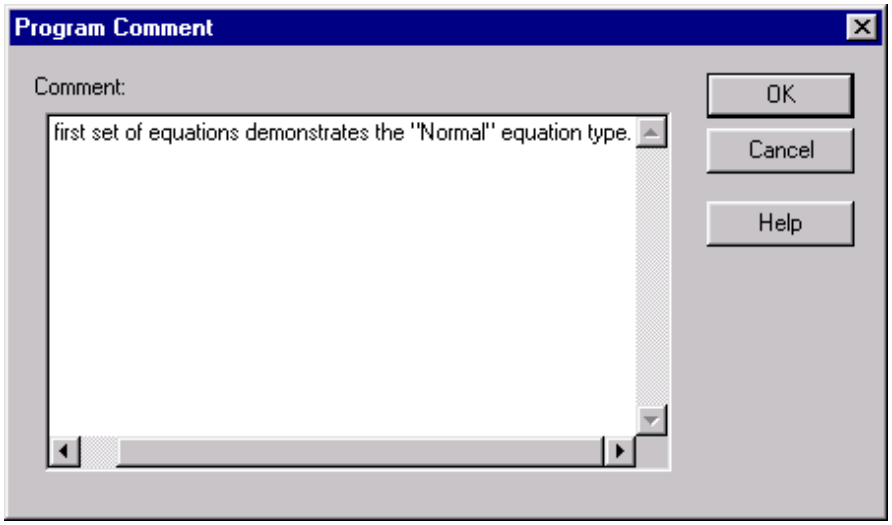

Figure 5-14. Program Comment Window

Choose **OK** to add the comment text to the *Logic* window at the location of the cursor (see Figure 5-15).

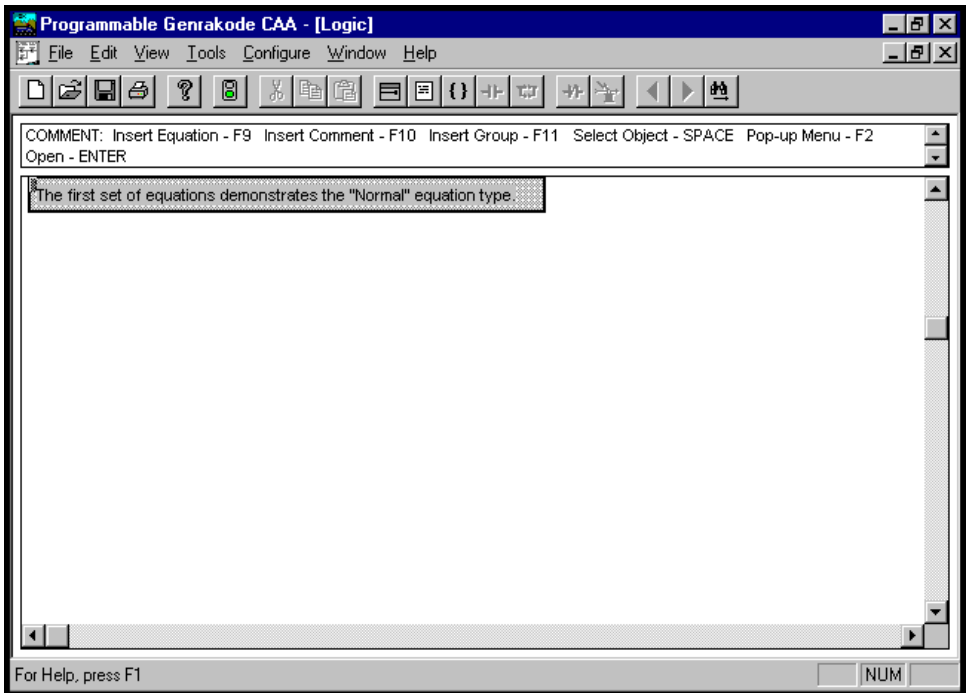
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
COMMENT: Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2
Open - ENTER
The first set of equations demonstrates the "Normal" equation type.
For Help, press F1
NUM

Figure 5-15. First Comment Appears in the Logic Window

Inserting A Group

Groups help to combine several related equations to improve the readability of the application. They DO NOT affect the functionality of the logic in any way.

To insert a group:

1. Click at the location in the *Logic* window where the group is to be inserted.
2. Click the **Insert Group** button on the toolbar.

OR

1. Click at the location in the *Logic* window where the group is to be inserted.
2. Press the **<F11>** key.

OR

1. Right click at the location in the *Logic* window where the group is to be inserted.
2. Choose **Insert Grp Rec** from the pop-up menu.

The *Logic Group* window appears (see Figure 5-16). Type the group name here.

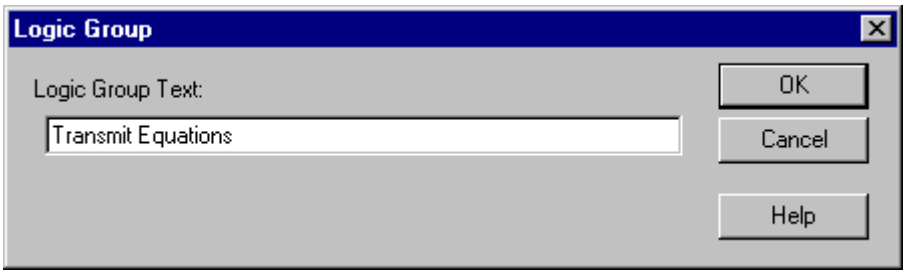

Figure 5-16. Logic Group Window

Choose **OK** to add the group name to the *Logic* window at the location of the cursor (see Figure 5-17).

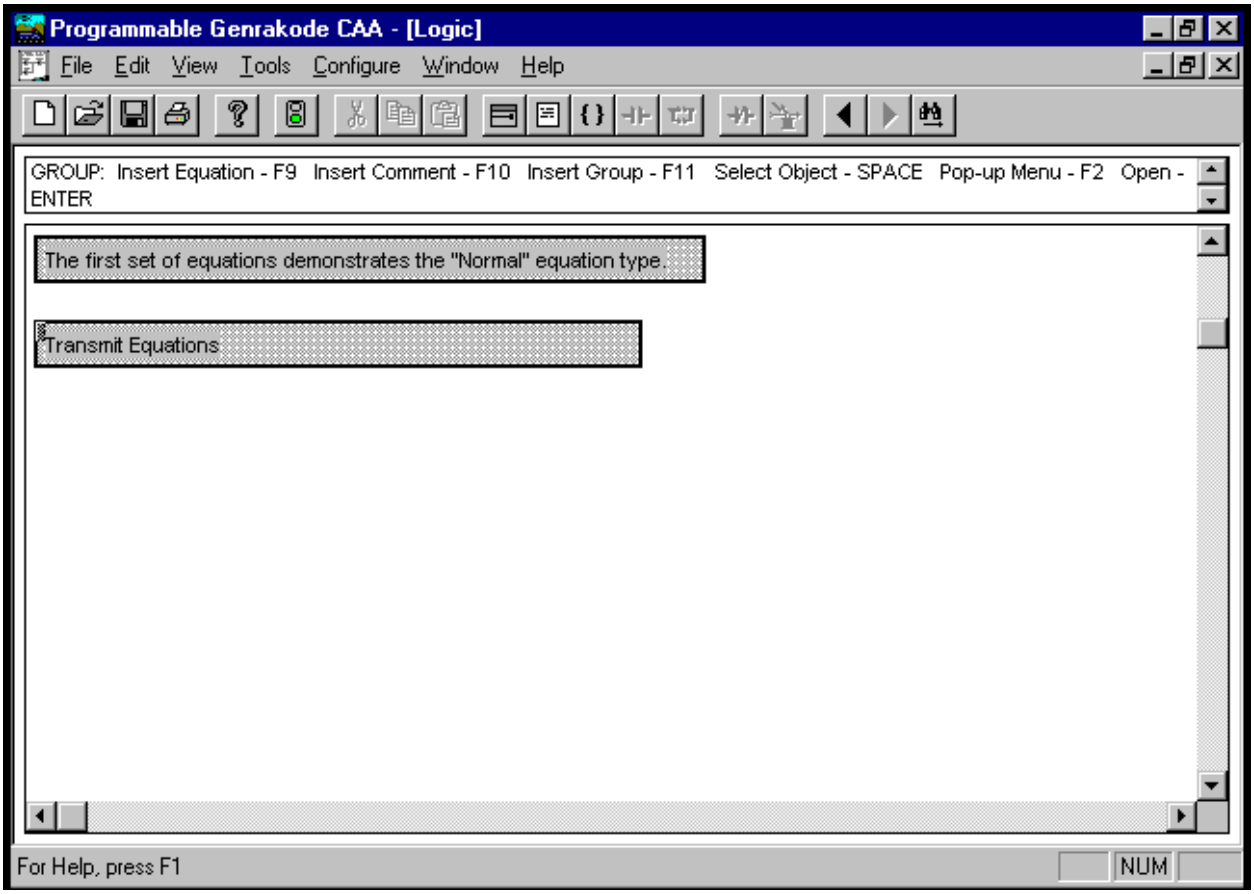
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
GROUP: Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2 Open - ENTER
The first set of equations demonstrates the "Normal" equation type.
Transmit Equations
For Help, press F1
NUM

Figure 5-17. First Group Appears in the Logic Window

Inserting An Equation

Logic equations can be entered in either ladder, straight-line or drop-line format. The drop-line format is used in this example.

To insert an equation:

1. Click at the location in the *Logic* window where the equation is to be inserted.
2. Click the **Insert Equation** button on the toolbar.

OR

1. Click at the location in the *Logic* window where the equation is to be inserted.
2. Press the **<F9>** key.

OR

1. Right click at the location in the *Logic* window where the equation is to be inserted.
2. Choose **Insert Equation** from the pop-up menu.

The *Equation Data* window appears (see Figure 5-18). Define the equation here. The fields are described below.

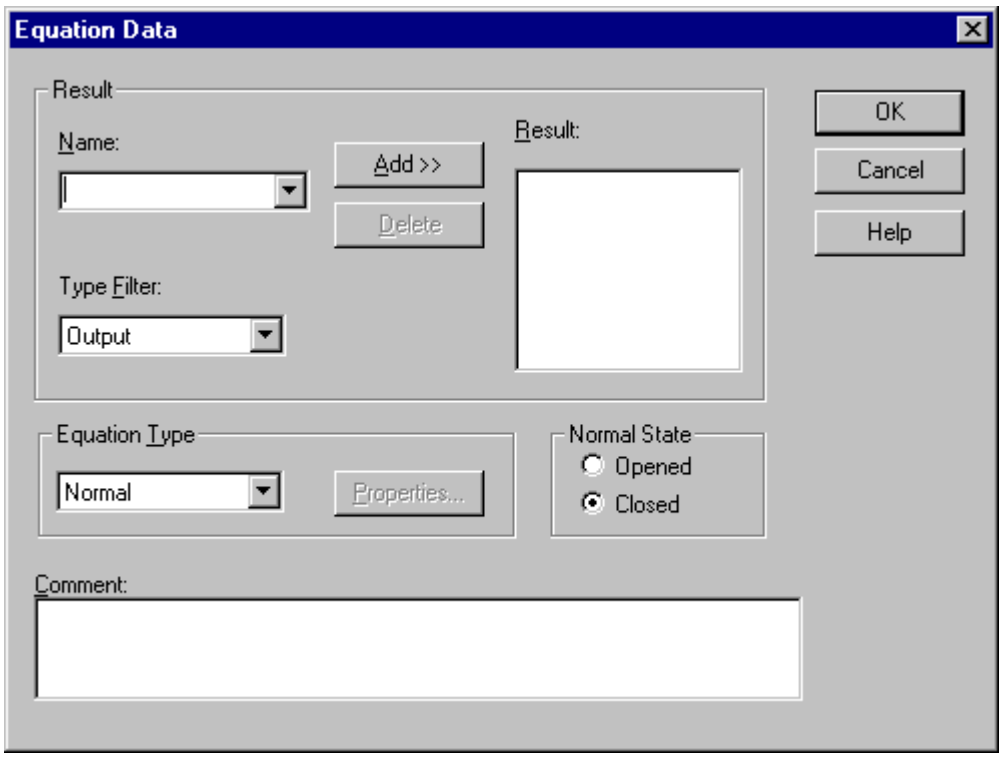

Figure 5-18. Equation Data Window for a New Equation

A single equation can have up to 10 results. Build a list of equation results by adding names from the list of available parameters. Parameters are organized into different categories by Filters, which help to narrow the list to desired parameters.

To select a different filter:
1. Click on the down arrow next to the Type Filter box.
2. Click on a filter name to select it.

Parameters in the selected group appear in the list of available parameters when selecting from the Name list.

To add a parameter to the Result list (see Figure 5-19):
1. Click on the down arrow next to the Name box.
2. Scroll up or down the list until the correct parameter name is visible. Note that the parameter Type Filter may need to be changed to find the desired name.
3. Click on the name to select it.
4. Click on the **Add** button to add the parameter to the Result list.

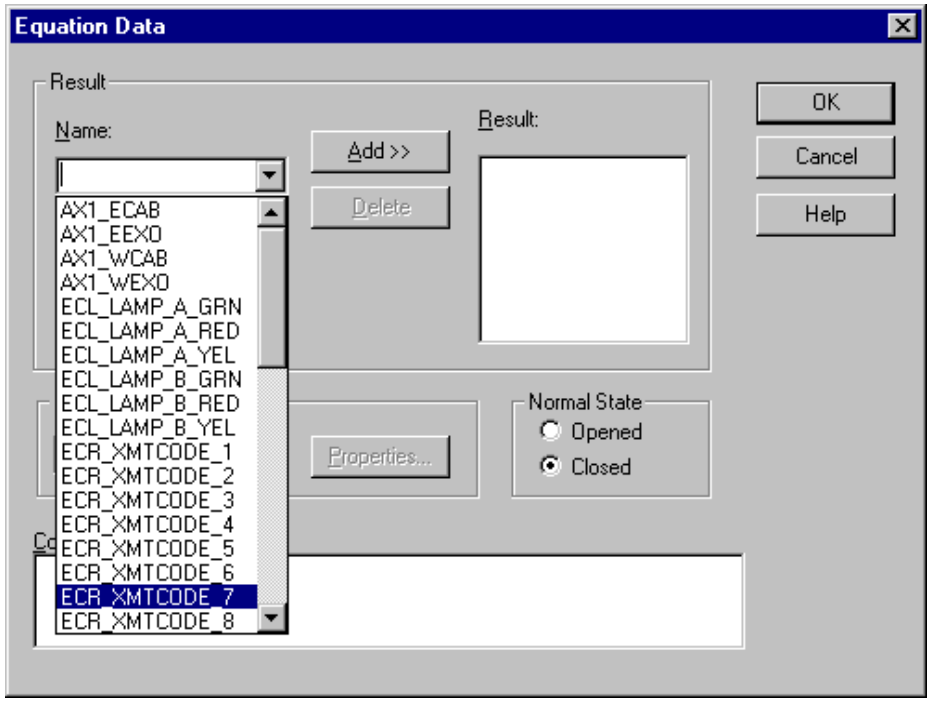

Figure 5-19. Adding Equation Results

Figure 5-20 shows a completed equation definition.

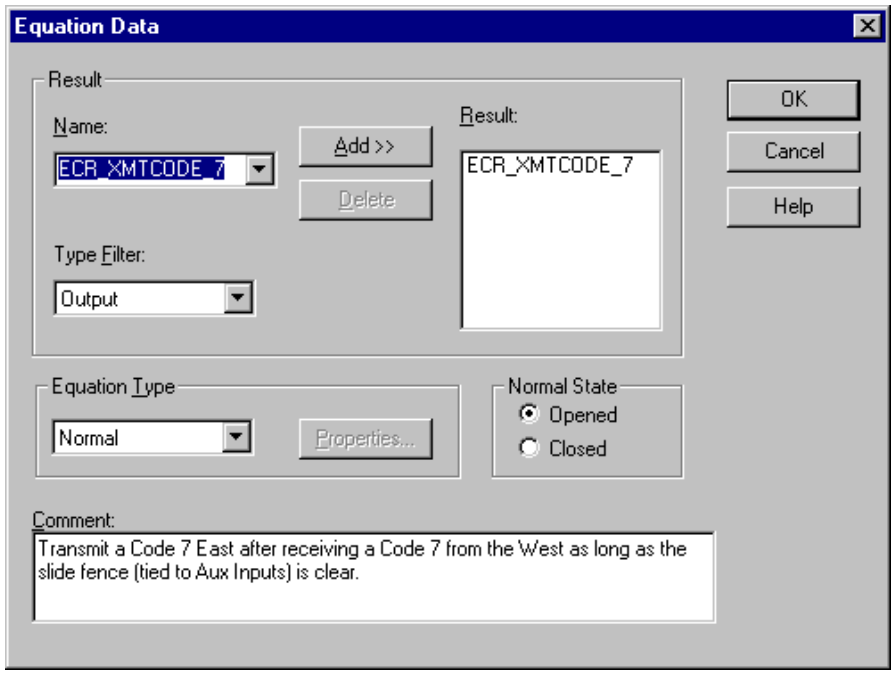

Figure 5-20. Equation Definition Complete

The Equation Type can be specified as either Normal, Delayed ON or Delayed OFF.

Normal:	The result of the equation goes true when the elements in one of the equation's paths evaluate true and false when the elements in all paths go false.
Delayed ON (Slow Pick):	The result of the equation goes true a specified amount of time after the elements in one of the equation's paths evaluate true and false when the elements in all paths go false.
Delayed OFF (Slow Release):	The result of the equation goes true when the elements in one of equation's paths evaluate true and false a specified amount of time after the elements in all paths evaluate false.

The Normal State of the equation is defined as the state of the result(s) of the equation when everything is operating normally and there is no train present in the appropriate track circuit. It can either be normally *Opened* or normally *Closed*. This state is used for display purposes only. It DOES NOT affect the functionality of the logic.

Just as comments in the application are useful, comments in individual equations can help to clarify logic, particularly in complex equations. Enter a brief description in the Comment section to explain anything about the equation which may be unclear.

After the equation definition is complete, click on the **OK** button The first equation is entered into the *Logic* window (see Figure 5-21). Notice that the Normal State of the equation is displayed in the direction of the arrow beneath the result coil. The down arrow in Figure 5-21 signifies that the equation is normally open.

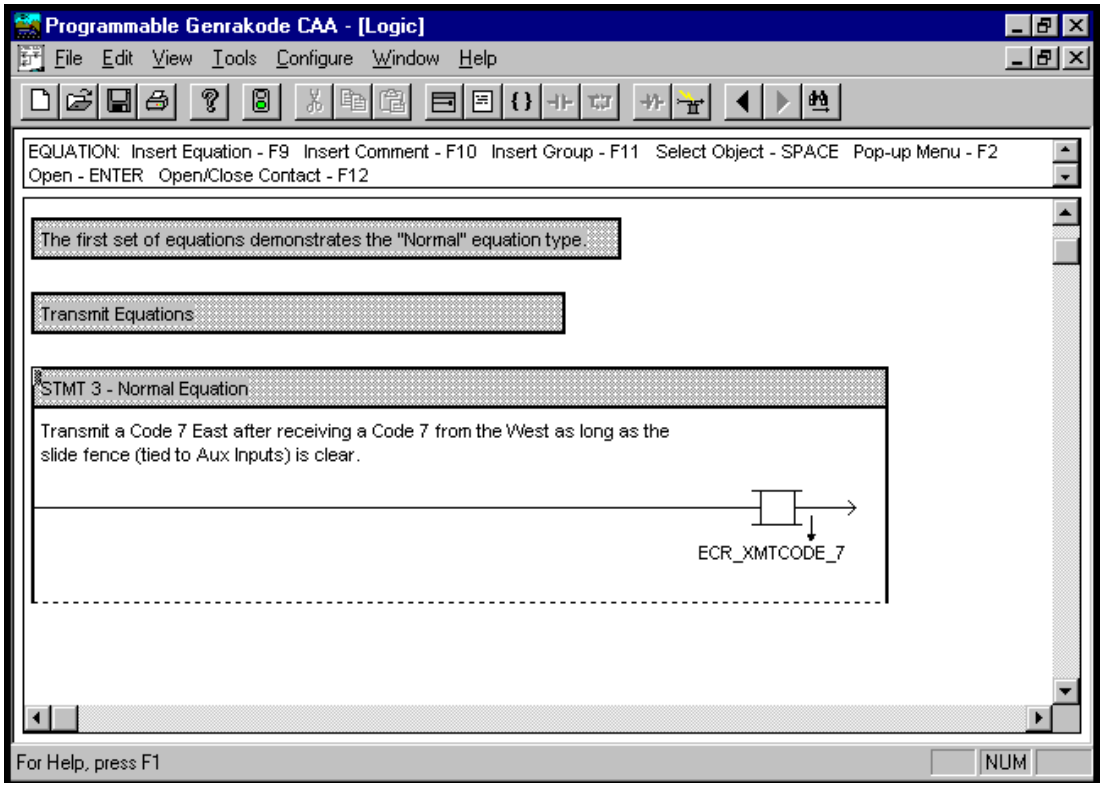
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
EQUATION: Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2
Open - ENTER Open/Close Contact - F12
The first set of equations demonstrates the "Normal" equation type.
Transmit Equations
STMT 3 - Normal Equation
Transmit a Code 7 East after receiving a Code 7 from the West as long as the slide fence (tied to Aux Inputs) is clear.
ECR_XMTCODE_7
For Help, press F1
NUM

Figure 5-21. First Equation Appears in the Logic Window

Inserting An Element

To build the equation logic, elements must be added to branches. The equation currently has a single branch (possible energy path).

To insert an element:

1. Click on the branch where the element is to be entered.
2. Click the **Insert Element** button on the toolbar.

OR

1. Click on the branch where the element is to be entered.
2. Press the **<F3>** key.

OR

1. Right click on the branch where the element is to be entered.
2. Choose **Insert Element** from the pop-up menu.

An element is inserted in the branch with the name "Undefined" highlighted in red (see Figure 5-22). This means that the element is not associated with any parameter. Before an application is complete, all elements must have associated parameter names. This allows several elements and/or branches to be inserted consecutively, thereby creating the structure of the equation first, and the elements to be named at a later time.

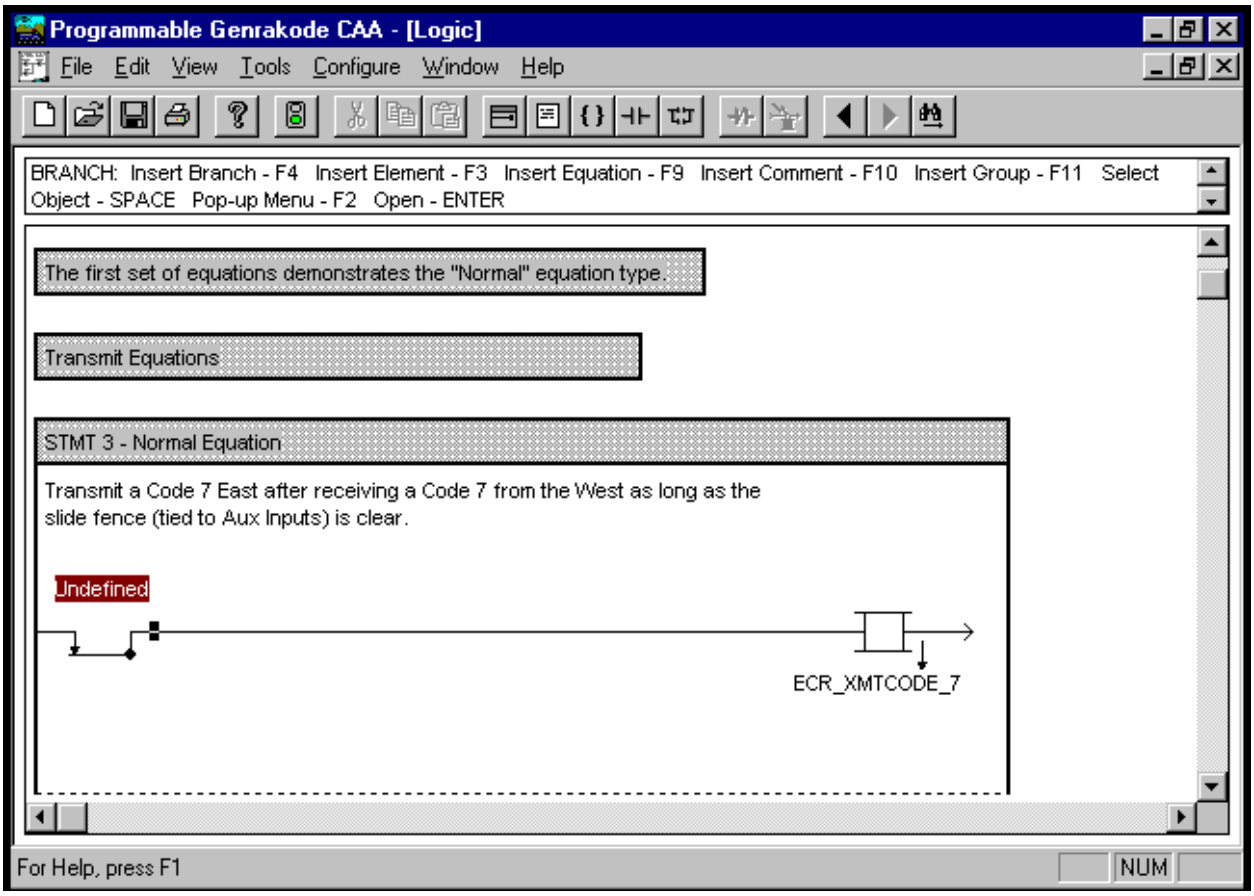
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
BRANCH: Insert Branch - F4 Insert Element - F3 Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2 Open - ENTER
The first set of equations demonstrates the "Normal" equation type.
Transmit Equations
STMT 3 - Normal Equation
Transmit a Code 7 East after receiving a Code 7 from the West as long as the slide fence (tied to Aux Inputs) is clear.
Undefined
ECR_XMTCODE_7
For Help, press F1
NUM

Figure 5-22. "Undefined" Element Inserted

To associate a parameter name with an element:

1. Click on the “Undefined” name.
2. Click on the down arrow, displaying a list of available names.
3. Scroll up or down the alphabetical list until the correct name is visible (see Figure 5-23).
4. Click on the name to select it.
5. Right click on the box to accept the selection.

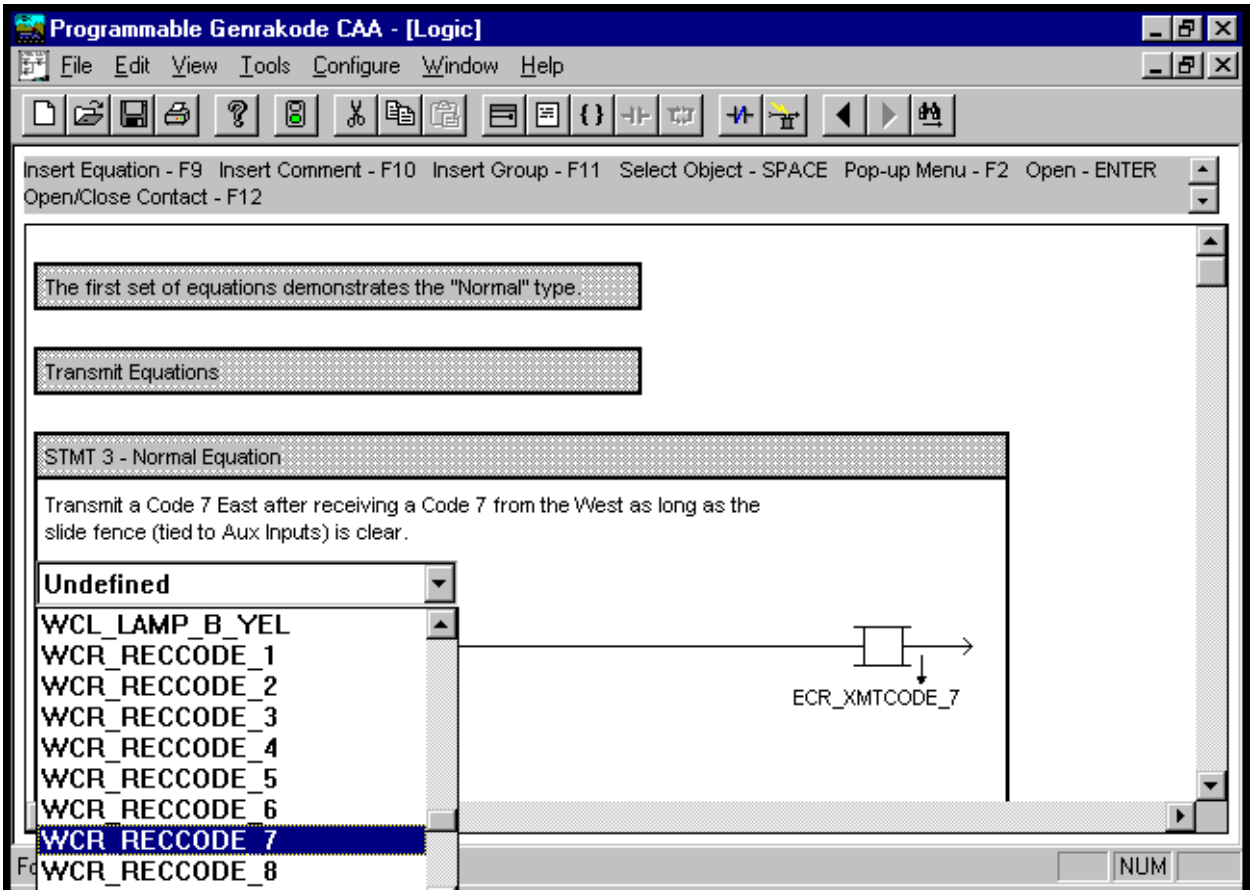
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2 Open - ENTER
Open/Close Contact - F12
The first set of equations demonstrates the "Normal" type.
Transmit Equations
STMT 3 - Normal Equation
Transmit a Code 7 East after receiving a Code 7 from the West as long as the slide fence (tied to Aux Inputs) is clear.
Undefined
WCL_LAMP_B_YEL
WCR_RECCODE_1
WCR_RECCODE_2
WCR_RECCODE_3
WCR_RECCODE_4
WCR_RECCODE_5
WCR_RECCODE_6
WCR_RECCODE_7
WCR_RECCODE_8
ECR_XMTCODE_7
NUM

Figure 5-23. List of Available Parameter Names

The new name now appears above the element. It is no longer highlighted in red, as it is a defined name (see Figure 5-24). The associated parameter can be changed at any time by following the same steps used to initially name it.

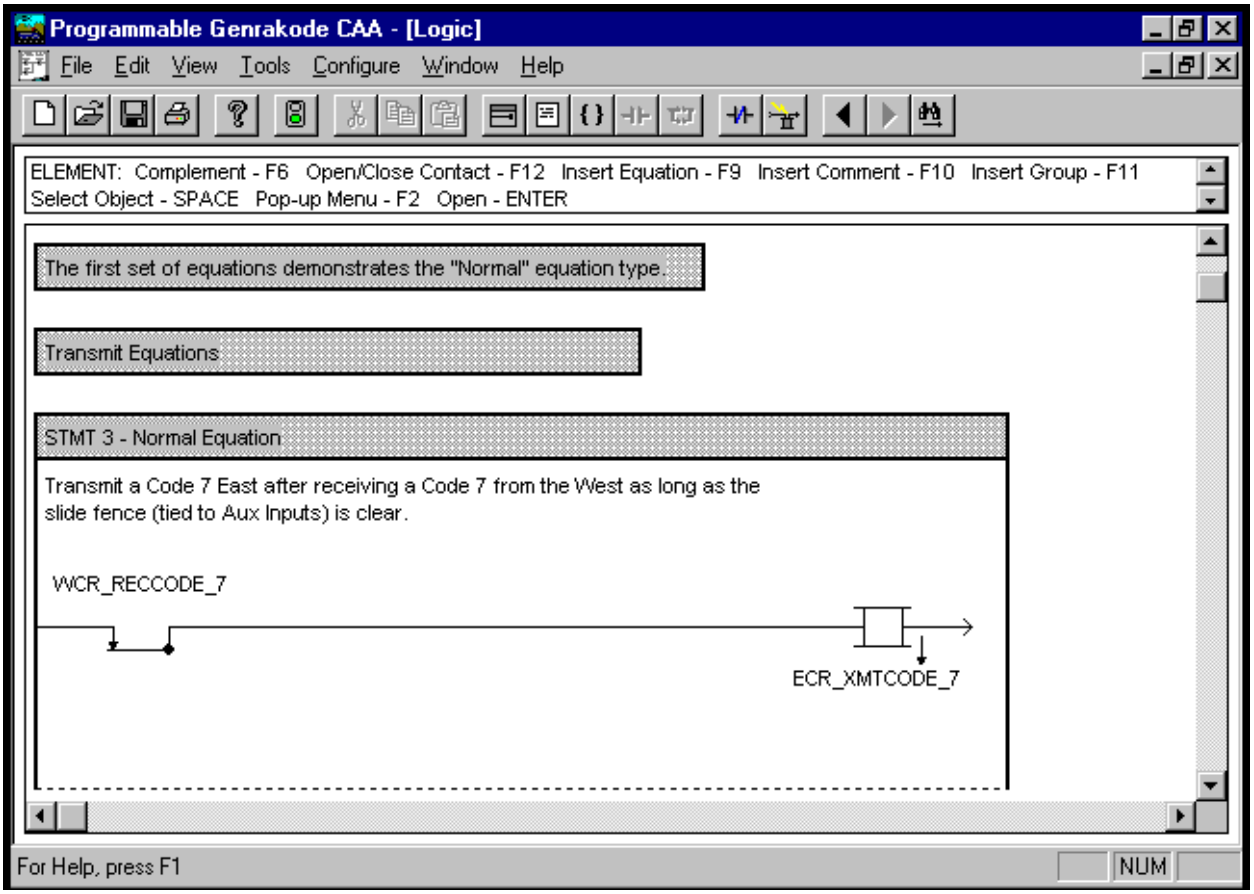
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
ELEMENT: Complement - F6 Open/Close Contact - F12 Insert Equation - F9 Insert Comment - F10 Insert Group - F11
Select Object - SPACE Pop-up Menu - F2 Open - ENTER
The first set of equations demonstrates the "Normal" equation type.
Transmit Equations
STMT 3 - Normal Equation
Transmit a Code 7 East after receiving a Code 7 from the West as long as the slide fence (tied to Aux Inputs) is clear.
WCR_RECCODE_7
ECR_XMTCODE_7
For Help, press F1
NUM

Figure 5-24. A Defined Element

Changing An Element's Normal State

An element has a normal state, just as an equation does. Once again, the normal state setting is for display purposes only. It DOES NOT affect the functionality of the logic in any way.

To change the normal state of an element:

1. Click on the element name.
2. Click the **Normally Opened/Closed** button on the toolbar.

OR

1. Right click on the element name.
2. Choose **Toggle Normal State** from the pop-up menu.

The normally open element now appears in Figure 5-25

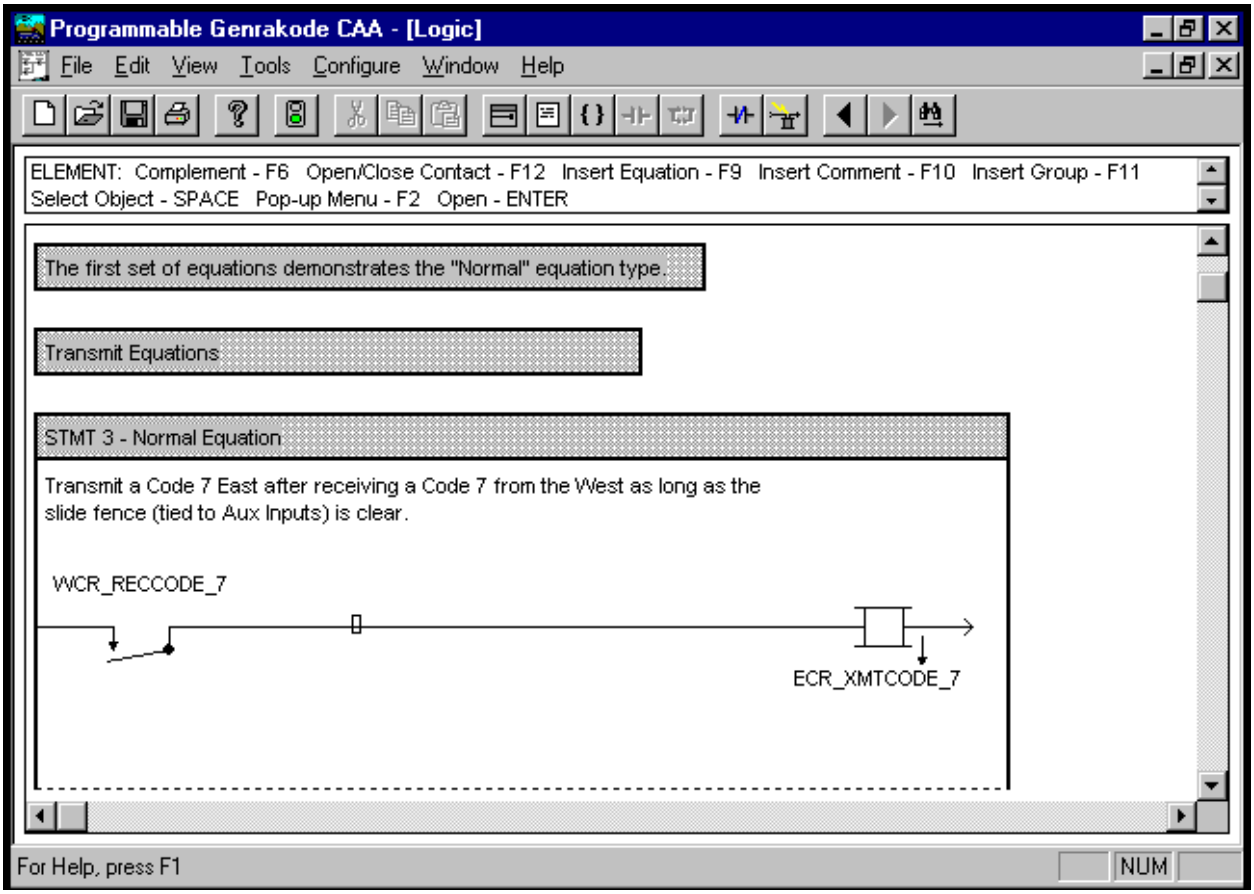
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
ELEMENT: Complement - F6 Open/Close Contact - F12 Insert Equation - F9 Insert Comment - F10 Insert Group - F11
Select Object - SPACE Pop-up Menu - F2 Open - ENTER
The first set of equations demonstrates the "Normal" equation type.
Transmit Equations
STMT 3 - Normal Equation
Transmit a Code 7 East after receiving a Code 7 from the West as long as the slide fence (tied to Aux Inputs) is clear.
WCR_RECCODE_7
ECR_XMTCODE_7
For Help, press F1
NUM

Figure 5-25. A Normally Open Element

The remaining two elements needed for this equation (references to the auxiliary inputs) can be added in a similar manner. The completed equation appears in Figure 5-26.

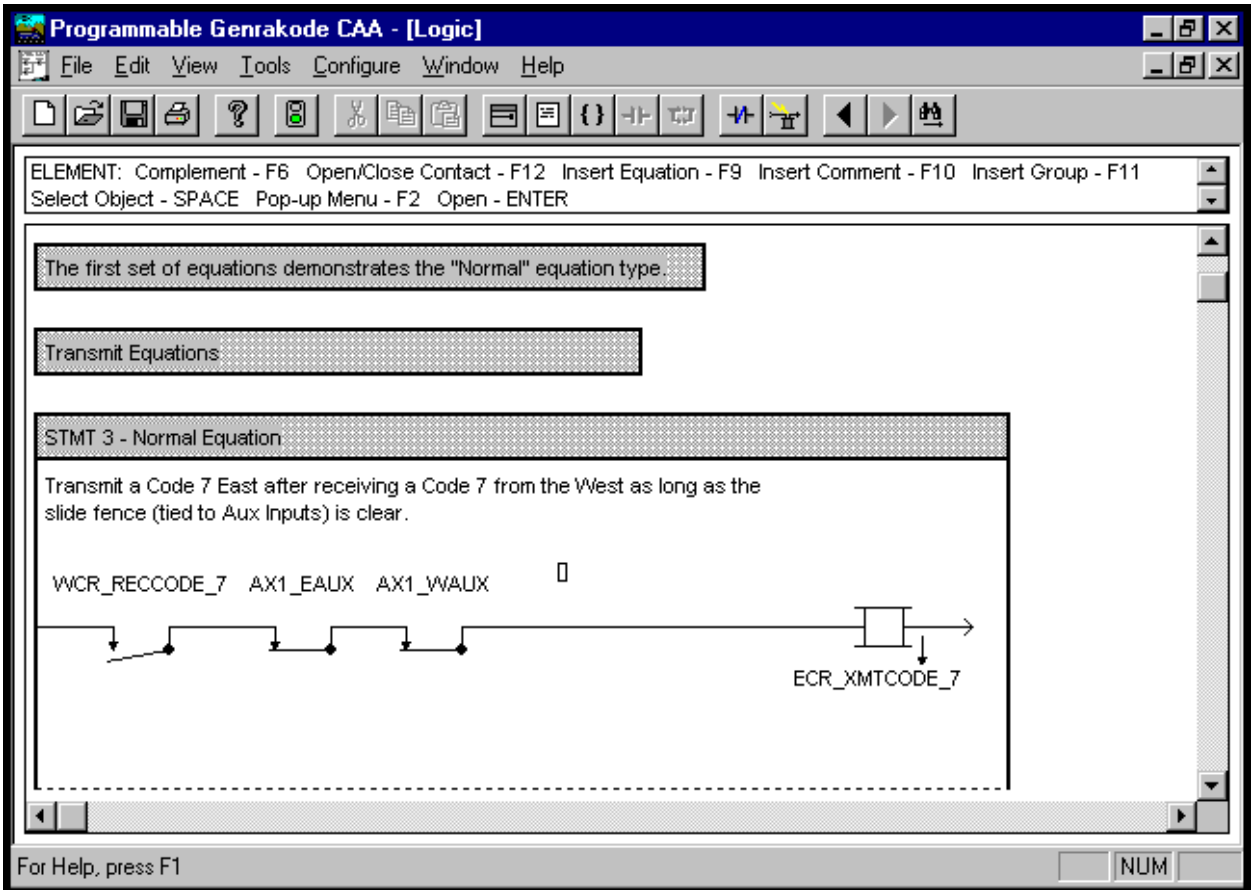
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
ELEMENT: Complement - F6 Open/Close Contact - F12 Insert Equation - F9 Insert Comment - F10 Insert Group - F11
Select Object - SPACE Pop-up Menu - F2 Open - ENTER
The first set of equations demonstrates the "Normal" equation type.
Transmit Equations
STMT 3 - Normal Equation
Transmit a Code 7 East after receiving a Code 7 from the West as long as the slide fence (tied to Aux Inputs) is clear.
WCR_RECCODE_7 AX1_EAUX AX1_WAUX
ECR_XMTCODE_7
For Help, press F1
NUM

Figure 5-26. A Complete Equation

Inserting A Delay Equation

Delayed ON (slow pick) and Delayed OFF (slow release) equations are inserted in the same way as a normal equation. Delay equations, however, are differentiated by their Equation Type property.

To specify a Delayed ON (OFF) equation (see Figure 5-27):
1. Click on the down arrow next to the Equation Type box.
2. Choose the *Delayed ON* (*OFF*) type.

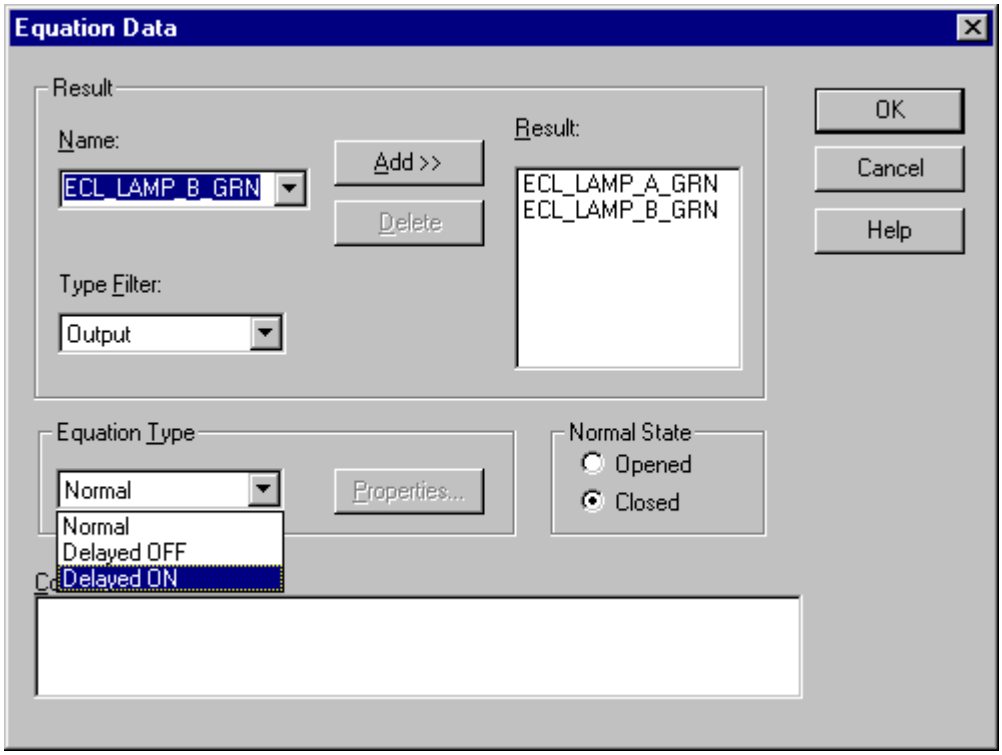

Figure 5-27. Creating a Delayed ON Equation

To specify the delay time:
1. Click the **Properties** button. The *Equation Properties* window appears (see Figure 5-28.).
2. Enter the delay time in minutes and seconds.

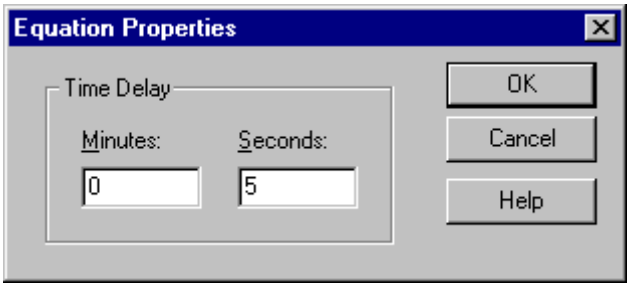

Figure 5-28. Equation Properties Window

Click **OK** to accept the equation setup. The new delay equation appears in the Logic Window (see Figure 5-29). Note that the delay time appears in the equation title and the result coil changes to reflect the equation type.

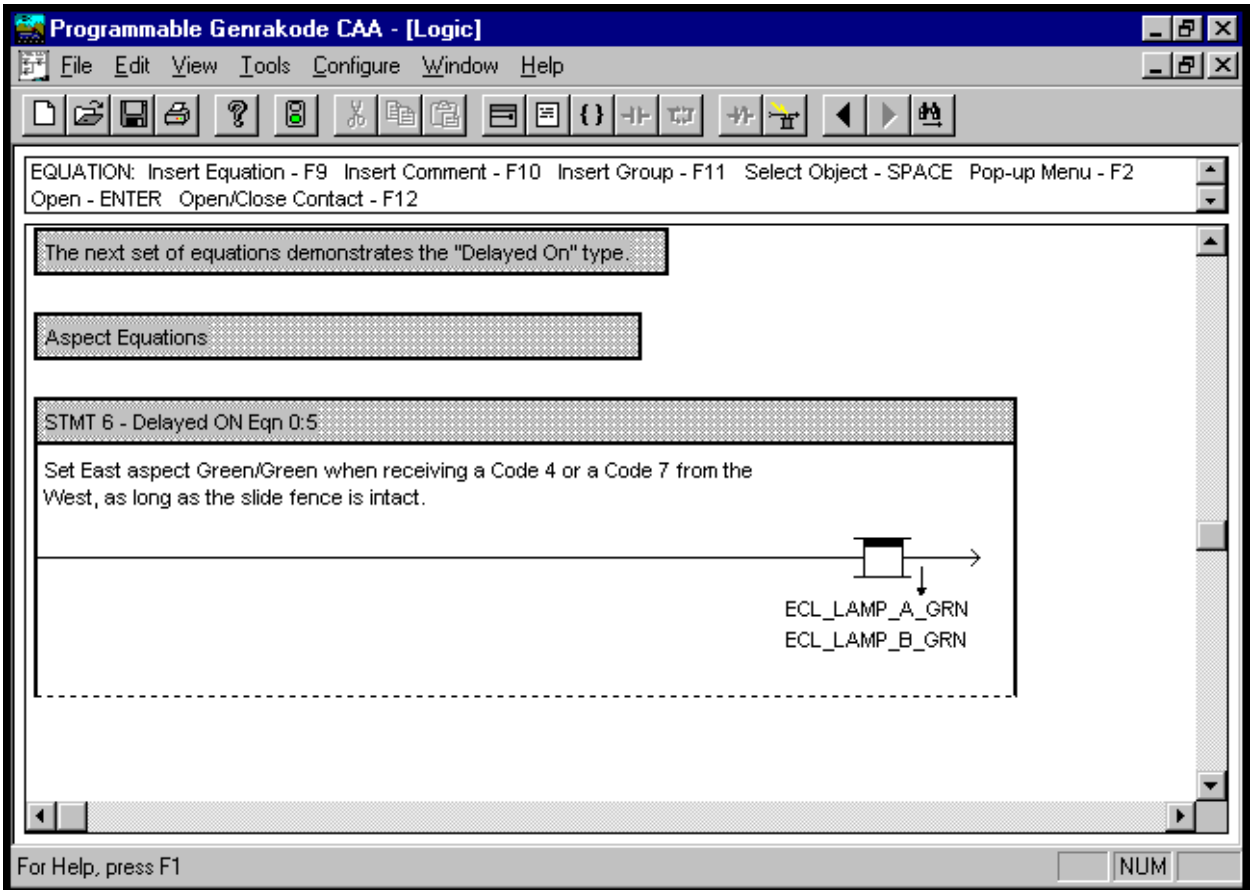
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
EQUATION: Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2
Open - ENTER Open/Close Contact - F12
The next set of equations demonstrates the "Delayed On" type.
Aspect Equations
STMT 6 - Delayed ON Eqn 0:5
Set East aspect Green/Green when receiving a Code 4 or a Code 7 from the West, as long as the slide fence is intact.
ECL_LAMP_A_GRN
ECL_LAMP_B_GRN
For Help, press F1
NUM

Figure 5-29. New Delayed ON Equation

Inserting A Branch

Multiple possible energy paths are created by inserting multiple branches. Each branch provides an alternative path for energy flow. For an equation to evaluate true (be energized), energy must be able to flow along at least one of its branches.

To insert a new branch:

1. Click on the branch to which the alternative energy path is to be added.
2. Click the **Insert Branch** button on the toolbar.

OR

1. Click on the branch to which the alternative energy path is to be added.
2. Press the **<F4>** key.

OR

1. Right click on the branch to which the alternative energy path is to be added.
2. Choose **Insert Branch** from the pop-up menu.

A new branch is inserted off the original, with a default “Undefined” element inserted (see Figure 5-30).

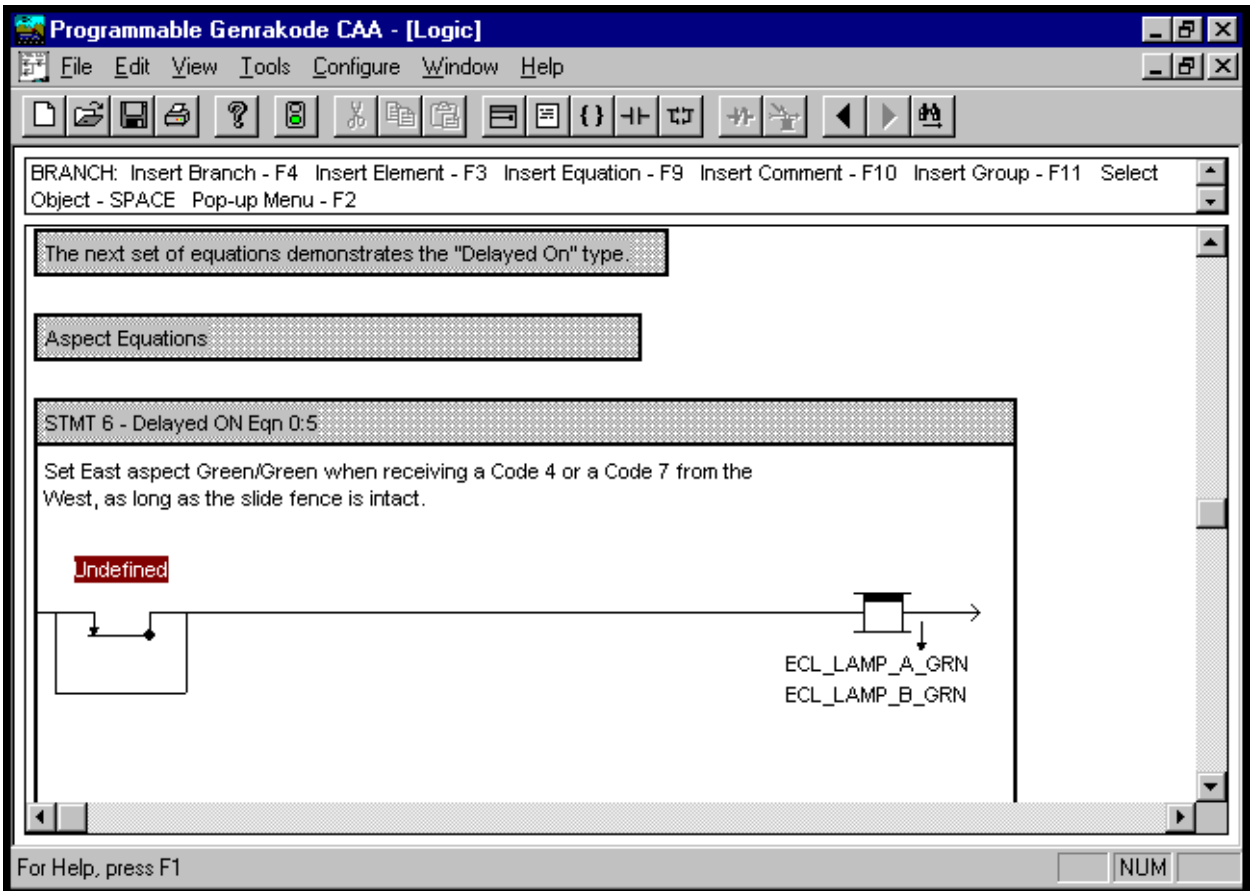
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
BRANCH: Insert Branch - F4 Insert Element - F3 Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2
The next set of equations demonstrates the "Delayed On" type.
Aspect Equations
STMT 6 - Delayed ON Eqn 0:5
Set East aspect Green/Green when receiving a Code 4 or a Code 7 from the West, as long as the slide fence is intact.
Undefined
ECL_LAMP_A_GRN
ECL_LAMP_B_GRN
For Help, press F1
NUM

Figure 5-30. New Branch

The default element is defined in the same manner described in the section Inserting an Element (page 5-19). New elements are added to the branch and defined in a similar manner. The completed equation appears in Figure 5-31.

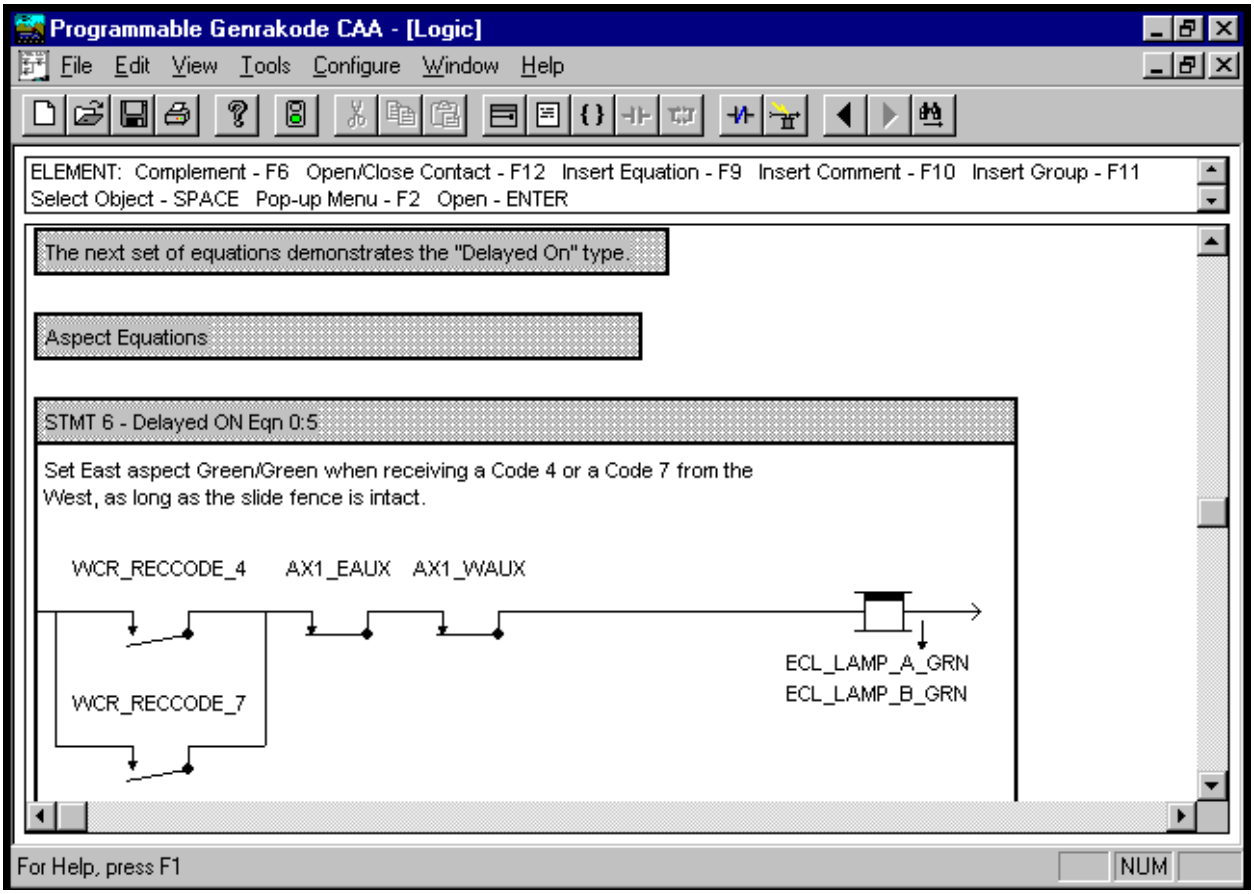
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
ELEMENT: Complement - F6 Open/Close Contact - F12 Insert Equation - F9 Insert Comment - F10 Insert Group - F11
Select Object - SPACE Pop-up Menu - F2 Open - ENTER
The next set of equations demonstrates the "Delayed On" type.
Aspect Equations
STMT 6 - Delayed ON Eqn 0:5
Set East aspect Green/Green when receiving a Code 4 or a Code 7 from the West, as long as the slide fence is intact.
WCR_RECCODE_4
AX1_EAUX
AX1_WAUX
WCR_RECCODE_7
ECL_LAMP_A_GRN
ECL_LAMP_B_GRN
For Help, press F1
NUM

Figure 5-31. Completed Delayed ON Equation

Complementing An Element

The back contact of a relay is simulated by complementing a logic element. An equation with no complemented elements appears in Figure 5-32.

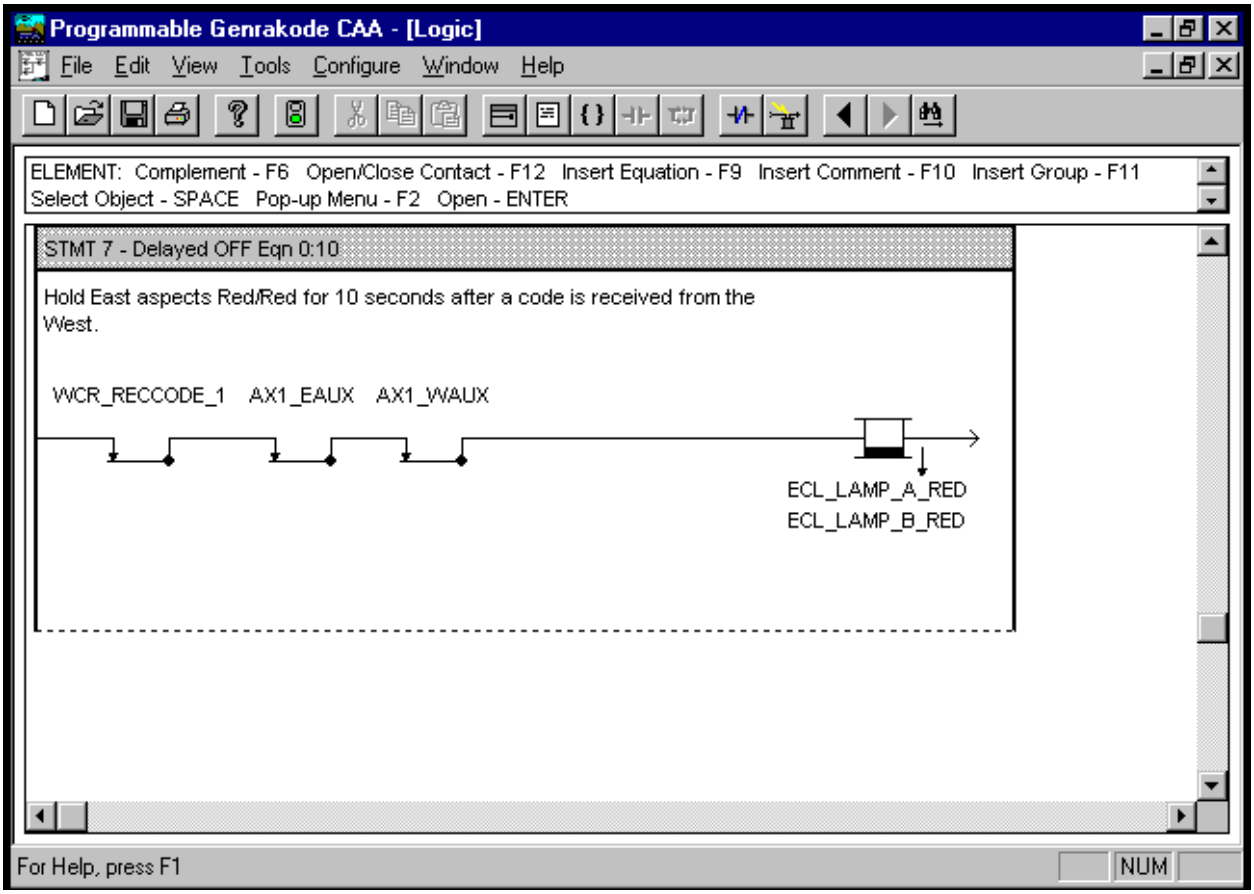
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
ELEMENT: Complement - F6 Open/Close Contact - F12 Insert Equation - F9 Insert Comment - F10 Insert Group - F11
Select Object - SPACE Pop-up Menu - F2 Open - ENTER
STMT 7 - Delayed OFF Eqn 0:10
Hold East aspects Red/Red for 10 seconds after a code is received from the West.
WCR_RECCODE_1 AX1_EAUX AX1_WAUX
ECL_LAMP_A_RED
ECL_LAMP_B_RED
For Help, press F1
NUM

Figure 5-32. Initial State of the First Element

To complement an element:

1. Click on the element.
2. Click the **Complement** button on the toolbar.

OR

1. Click on the element.
2. Press the **<F6>** key.

OR

1. Right click on the element.
2. Choose **Complement Element** from the pop-up menu.

The element now appears in its complemented state (see Figure 5-33). Note that unlike the Normal State, the complemented/uncomplemented state of the element DOES affect the functionality of the logic.

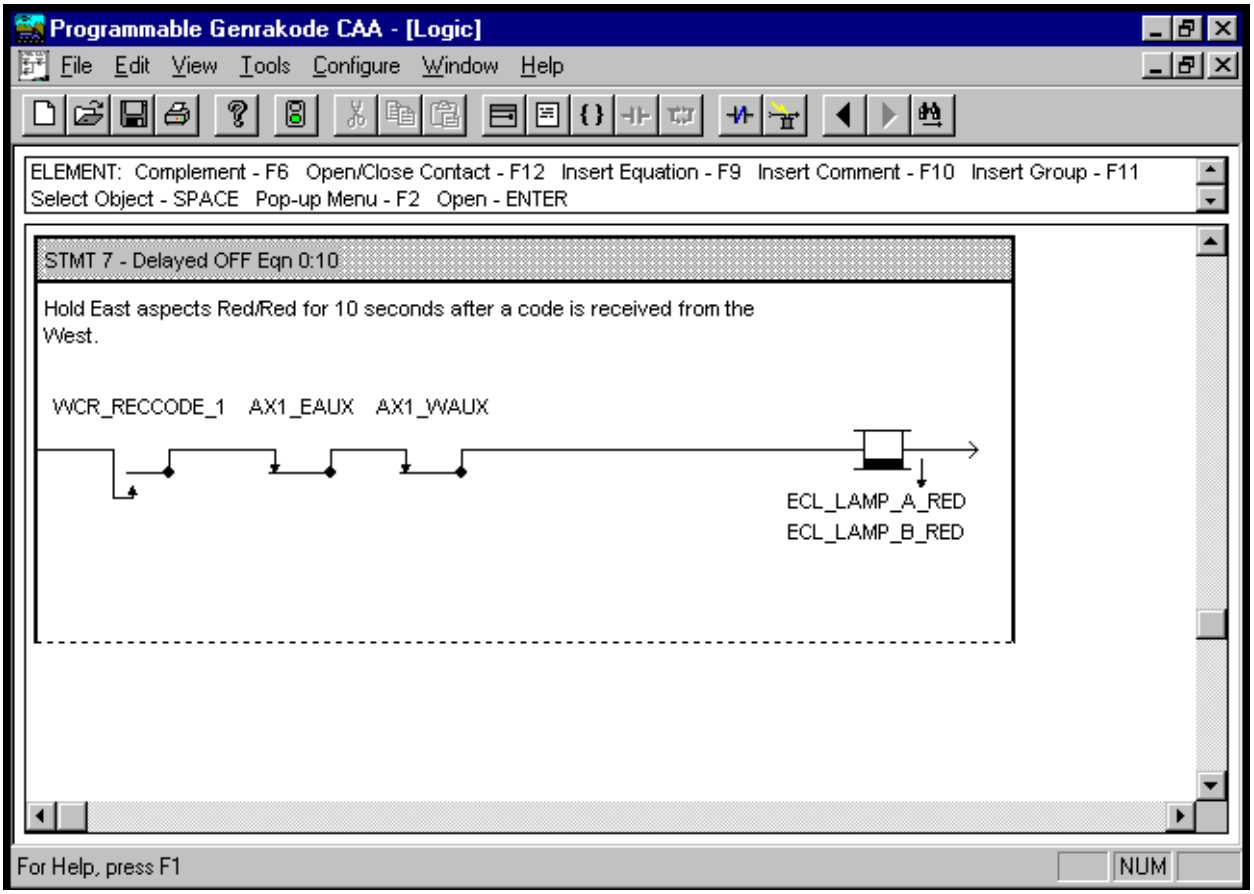
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
ELEMENT: Complement - F6 Open/Close Contact - F12 Insert Equation - F9 Insert Comment - F10 Insert Group - F11
Select Object - SPACE Pop-up Menu - F2 Open - ENTER
STMT 7 - Delayed OFF Eqn 0:10
Hold East aspects Red/Red for 10 seconds after a code is received from the West.
WCR_RECCODE_1 AX1_EAUX AX1_WAUX
ECL_LAMP_A_RED
ECL_LAMP_B_RED
For Help, press F1
NUM

Figure 5-33. First Element Complemented

SAVING AN APPLICATION

An application cannot be compiled until it is saved.
To save the application:

Click the **Save** button on the toolbar	OR Click on the **File** menu and choose **Save.**

The file will automatically be given a .PGK extension. It is this .PGK file which is used by the compiler to create the downloadable .HEX file.

SETTING THE RUN CONTROLS

When the compiler converts a .PGK file to a .HEX file, it generates a report file which contains information determined by user-selectable Run Controls settings. Scroll down the *Configuration* window, beneath the Module Configuration settings, to view the current Run Controls settings (see Figure 5-34). Once the settings have been customized, they can be saved to eliminate the need to reset them for every application.

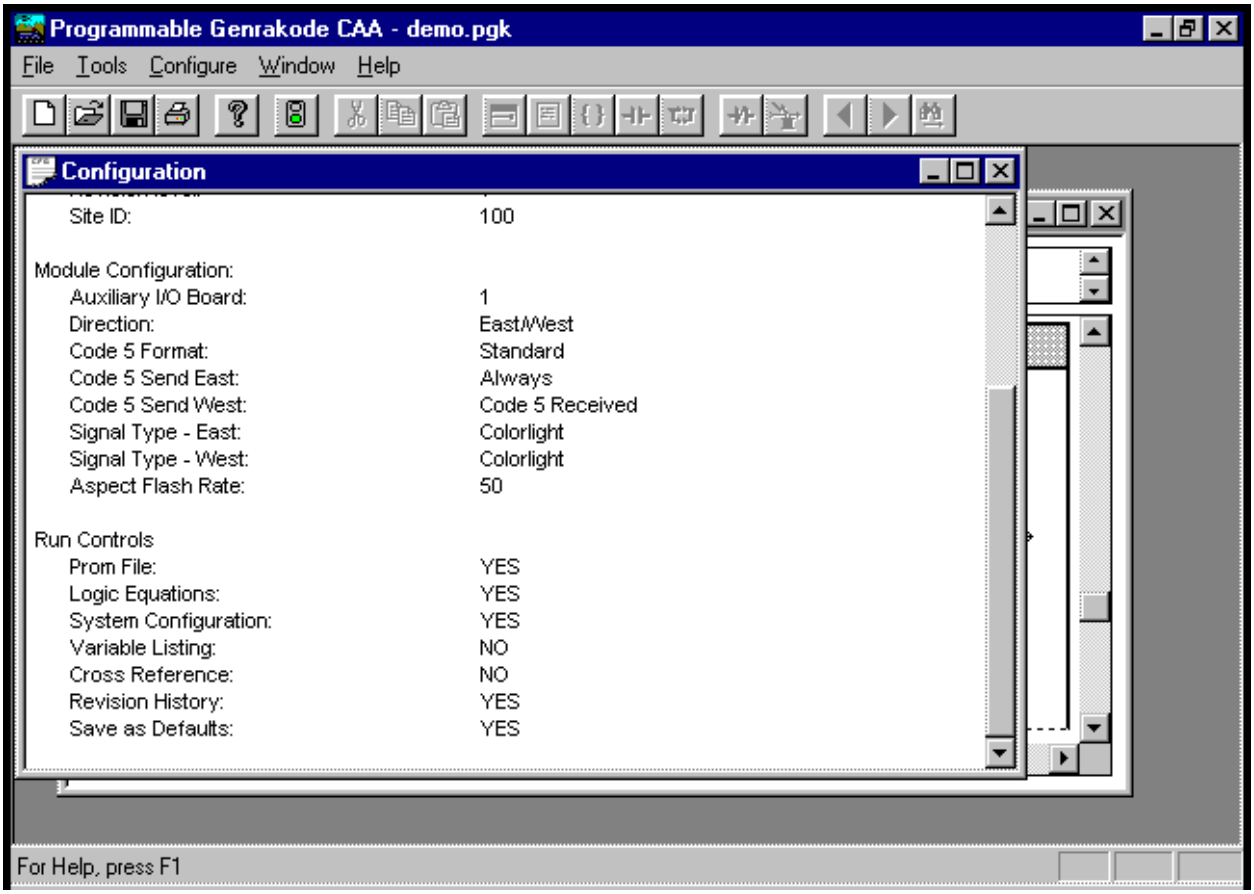

Figure 5-34. Run Controls Settings in the Configuration Window

To modify the Run Controls settings, click on the **Tools** menu and choose **Run Controls**. The *Run Controls* window appears (see Figure 5-35).

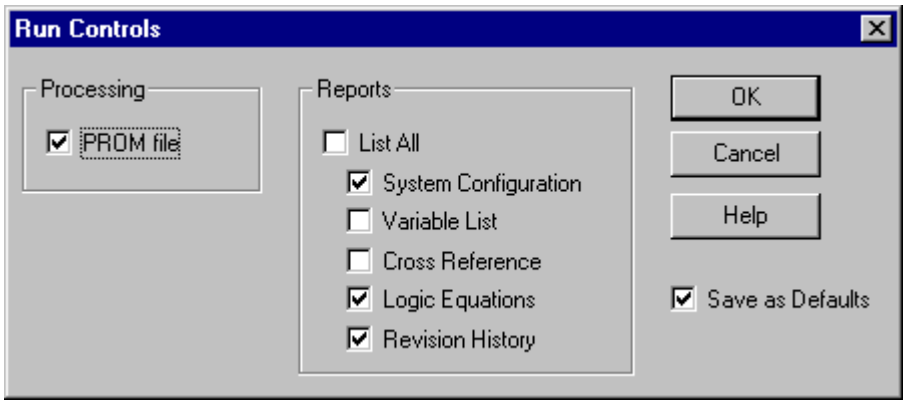

Figure 5-35. Run Controls Window

An option with a "checked" box indicates that data will be included in the report file when the application is compiled. The following options can be set:

Field Contents:

PROM file	When the "PROM file" box is checked, a new .HEX file is generated every time the application is compiled.
List All	A check in this box automatically includes all options listed below it.
System Configuration	Check here to include the application's module configuration in the report file.
Variable List	This is a list of the variables used in the application and their associated values in the .HEX file. This information is not normally of use and should not be included in the report.
Cross Reference	This is a list of variable names and their associated addresses in the .HEX file. This information is not normally of use and should not be included in the report.
Logic Equations	When this box is checked, the application logic equations appear in the report.
Revision History	This option includes the revision information entered in the Documentation section in the report file.

The Save as Defaults option makes it possible to save the most common settings to avoid re-selecting them for every application. CHECK the Save as Defaults to save the settings. Once the default setting have been saved, the user can modify the options for a particular application without having to overwrite the default settings by UNCHECKING the Save as Defaults box.

COMPILING AN APPLICATION

When the Run Controls options are set, the application is ready to be compiled.

To compile the open application click the **Compile** button on the toolbar.

A *Compile* window appears overlapping the others (see Figure 5-36); showing the progress of the compiler. After the .HEX file is generated, the *Application Data Verifier Progress* window appears to show the progress of the verification of the data structures created by the compiler. Successful verification of the file is displayed for the user in the *Compile* window.

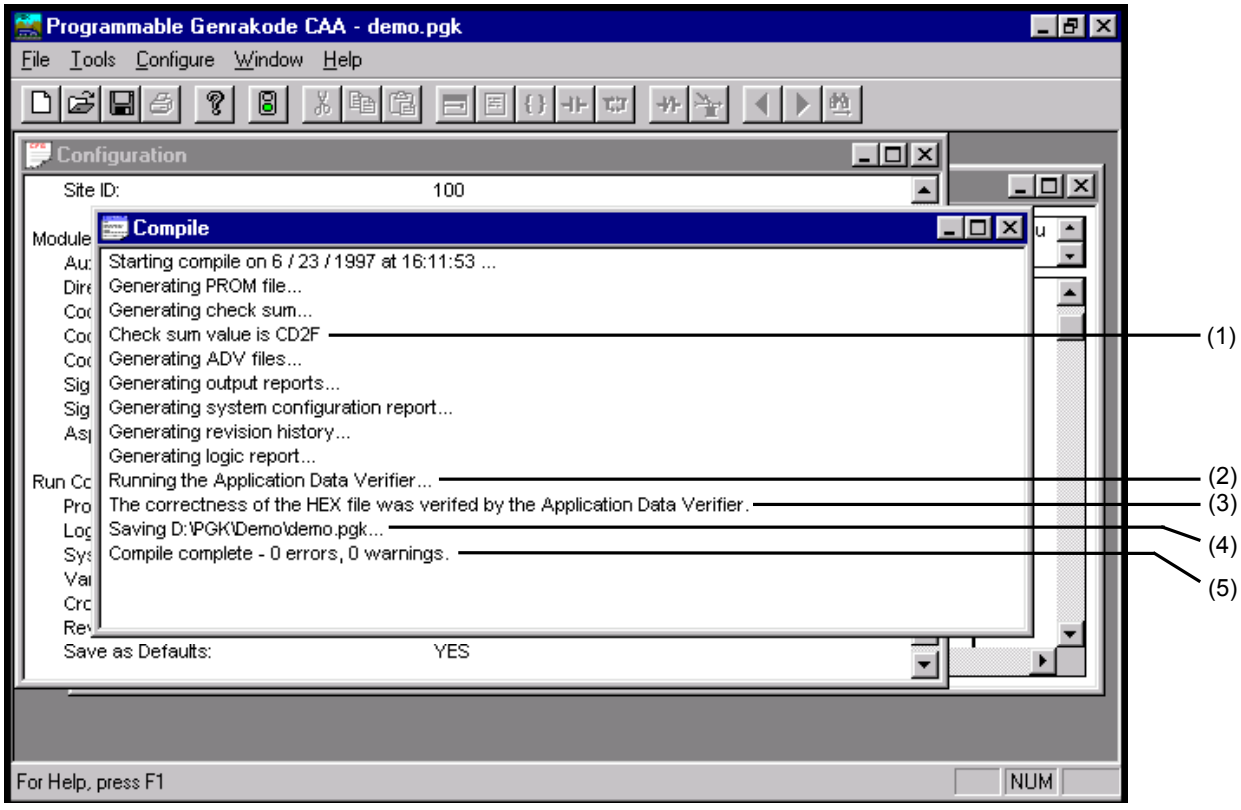

Figure 5-36. Compile Window

The following messages from the compiler are of particular interest:

1) The compiler generates a check sum based upon the data in the .HEX file. The check sum returned by the PGK download program should match this number to verify a correct download.

2) The Application Data Verifier is run automatically when the application is compiled.

3) The data structures in the .HEX file generated by the compiler were created correctly. DO NOT download an application .HEX file that is not correctly verified. It will not function.

4) The .PGK file is saved immediately after the compilation is complete. The compile date, time and check sum are stored in the PGK file at this time. This ensures that the source used to generate the .HEX file is saved and corresponds to the application logic in the .PGK file. It is the designer's responsibility to makes sure this file is then stored in a location where it cannot be accidentally modified.

5) The compiler reports to the screen the number of errors and warnings generated during the compilation. These numbers should both be 0. Error and warning numbers are provided with brief explanations. Press the <F1> key to access a more detailed description of the errors and their possible causes. If an error occurs, a .HEX file is not generated. After the errors are corrected, the application (.PGK file) should be recompiled to generate the corresponding .HEX file.

SECTION 6

DOWNLOADING AN APPLICATION

GENERAL

After the .HEX file is successfully generated and verified, it can be downloaded to the PGK CPU board in the Genrakode™ module. Turn the module on and connect the PC serial cable to the PGK CPU's serial connector. In addition, verify that the jumpers on the back of the module are correctly wire-wrapped based on the revision level and site ID specified in the documentation section of the corresponding application .PGK file.

To view a list of jumpers which must be wire-wrapped:
1. Click on the **Tools** menu.
2. Choose **Wire Wrap List**.

The *Wire Wrap List* window appears (see Figure 6-1), showing the jumper pairs which must be wire-wrapped for the default Revision Level 1 and Site ID 100. See the *Genrakode™ Operations Manual* for more details on wire wrapping.

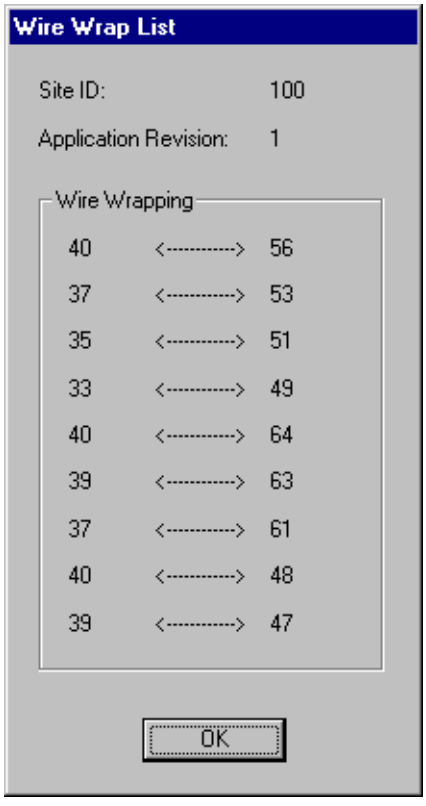

Figure 6-1. Wire Wrap List

To initiate the download process, click on the **Tools** menu and choose **Download Hex File**.

The DOS-based download program is started and appears in a window shown in Figure 6-2.

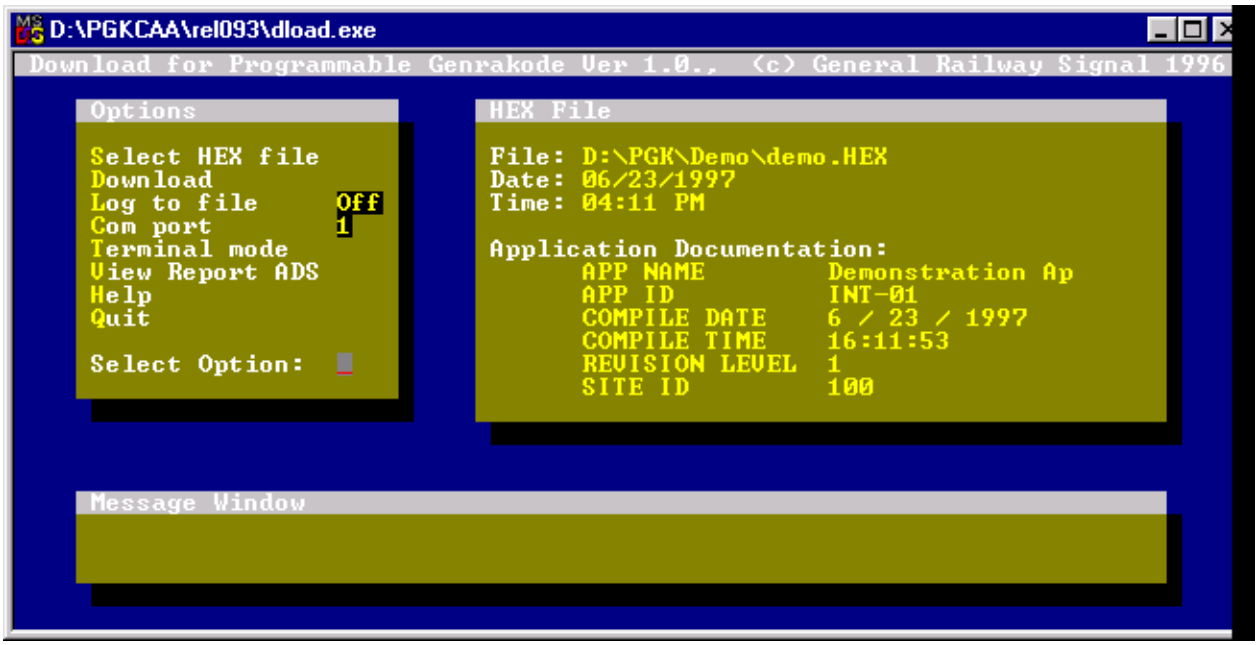

Figure 6-2. Download Window

Note that the application is automatically loaded. The documentation specified in the Documentation section of the application design appears in the *HEX File* window.

CHANGING THE COM PORT

The default COM port for communicating with the module is COM 1. If using COM 2, type ‘c’ to change the port to 2.

STARTING THE DOWNLOAD PROCESS

The download program automates all steps necessary to download the file. It reports its current step in the *Message* window and displays its progress in each step as percentage graphs in the *Progress* window (see Figure 6-3)

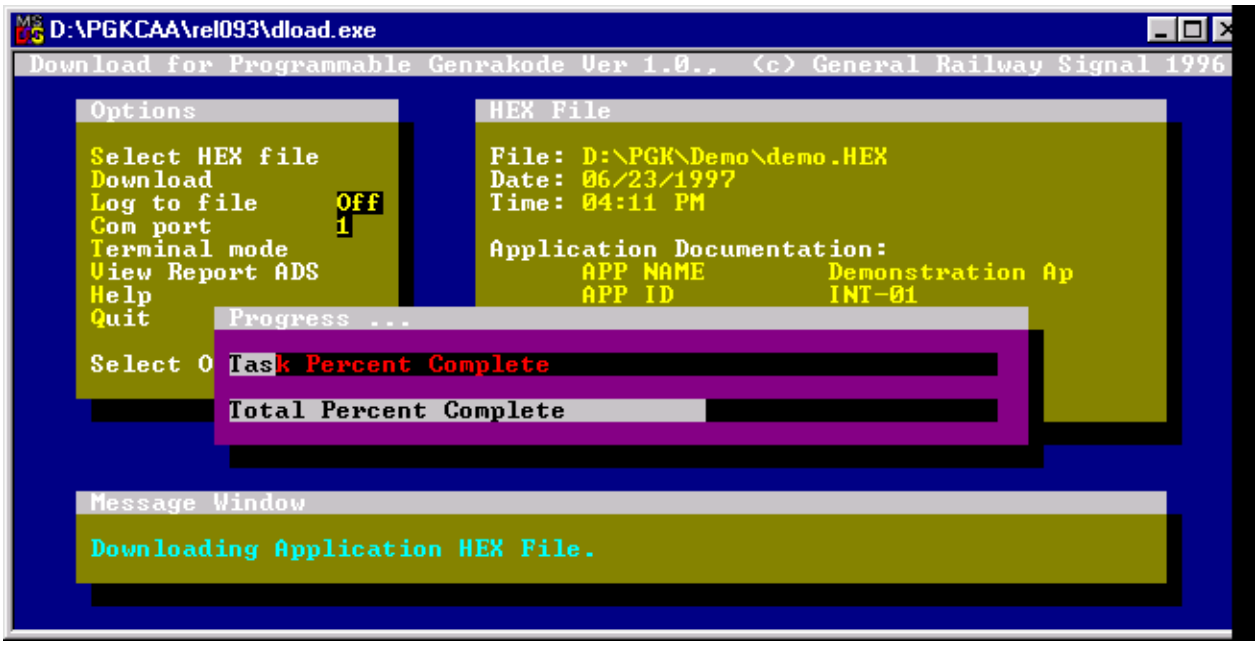

Figure 6-3. Download Progress Window

To initiate the download, type '**d**'. Verify the request by typing '**y**' when prompted.

The steps in the download process are listed below, in sequential order. The words in quotations are those which appear in the *Message* window as the download progresses:

"Establishing connection" sends commands to the PGK CPU to shut down the VPC and enter an interactive mode.

"Querying System Software Version" prompts the Genrakode™ module for its system software version number. If the number returned from the module does not match the version required by the application, a warning is displayed. You must decide to abort the download or continue, thereby authorizing the replacement of the system software. The download program enforces compliance between the system software and the application's .HEX file. If the system software version on the PGK CPU board does not comply with the application .HEX file and you choose to continue, the download program erases the existing system software version and downloads the appropriate one.

"Erasing application memory" erases any application that is currently on the module's CPU board.

"Erasing system memory" erases any system code that is currently stored on the module's CPU board. Note that this is only done if the system software version does not comply with the application .HEX file being downloaded.

"Speeding up communication" increases the baud rate on the serial line from 1200 to 19200, thereby increasing the speed of the download process.

"Downloading application HEX file" sends the currently-selected .HEX file to the Genrakode module.

"Downloading system HEX file", if required, sends the version of system software associated with the download program to the CPU board, ensuring compliance between the downloaded application .HEX file and system software.

When the process is complete, the application Check sum value is displayed in the *Message* window. This value is calculated by the download program based on the data it transfers. This number should match the Check sum generated by the PGK CAA to verify proper transmission.

QUITTING THE DOWNLOAD PROGRAM

Type '**q**' to terminate the download program and return to the PGK CAA.

SECTION 7

LOGIC EDITING SUPPORT FUNCTIONS

INTERNAL PARAMETERS

Internal parameters are useful as intermediate results in application logic to avoid the need for redundant structures.

To create an internal parameter:
1. Click on the **Tools** menu.
2. Drag the mouse pointer down to **Parameter Names.**
3. Click on **Internal**. The *Internal Parameters* window appears (see Figure 7-1).
4. In the Name box, type the name of the parameter to add.
5. Click on the **Add** button.
6. Repeat for the number of desired internal parameters.
7. Click on the **OK** button when done.

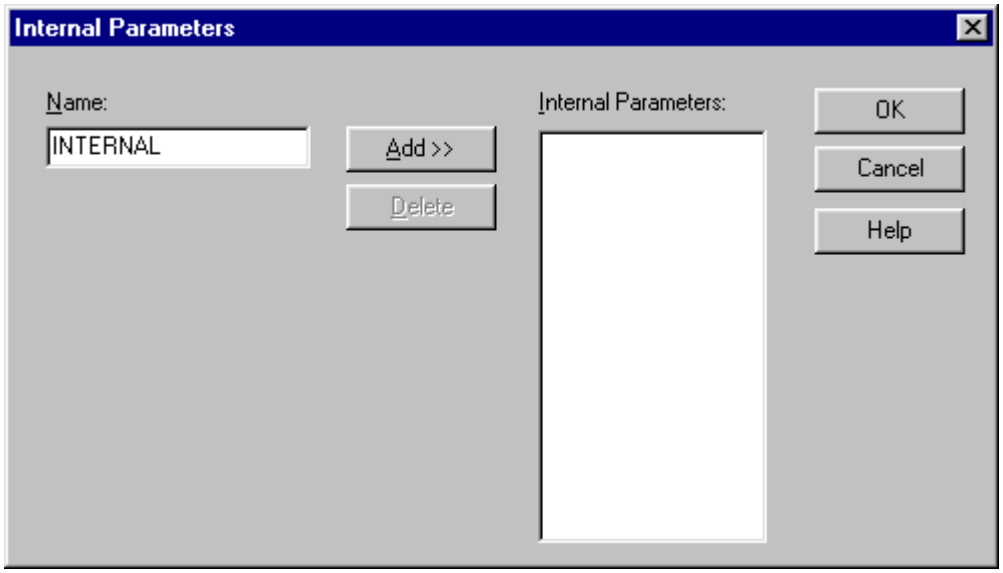

Figure 7-1. Internal Parameters Window

These parameters now appear under the Internal filter in the *Equation* window and in the list of parameters when defining an element.

STICK VARIABLES

The PGK CAA provides four pre-defined variables which are associated with the "STICK" LEDs on the CPU board. Two variables represent a movement in the East direction and two represent a movement to the West.

East

STK_ESTICK:	The East stick is stuck, that is, an eastbound train has crossed the insulated joint. The true state of this variable causes the East STICK LED to be lit solid.
STK_WSTICK_APP:	A train is approaching the insulated joint from the West, but has not yet crossed it. The true state of this variable causes the East STICK LED to blink.

West

STK_WSTICK:	The West stick is stuck, that is, a westbound train has crossed the insulated joint. The true state of this variable causes the West STICK LED to be lit solid.
STK_ESTICK_APP:	A train is approaching the insulated joint from the East, but has not yet crossed it. The true state of this variable causes the West STICK LED to blink.

The names of these parameters and all others, can be changed to correspond to user conventions. See the Section 8, Page 8-4 Parameter Names for more details.

PRINTING

The module configuration and the application logic can be printed.

To preview the configuration as it will print:
1. Click on the *Configuration* window to make it the ***active window***.
2. Click on the **File** menu.
3. Choose **Print Preview**.

To print the configuration:

1. Click on the *Configuration* window to make it the ***active window.***
2. Click the **Print** button on the toolbar.

OR
1. Click on the *Configuration* window to make it the ***active window***.
2. Click on the **File** menu.
3. Choose **Print**.

To preview the logic as it will print:
1. Click on the *Logic* window to make it the ***active window***.

2. Click on the **File** menu.
3. Choose **Print Preview**.

To print the logic:

1. Click on the *Logic* window to make it the ***active window*.**
2. Click the **Print** button on the toolbar.

OR

1. Click on the *Logic* window to make it the ***active window***.
2. Click on the **File** menu.
3. Choose **Print**.

VIEWING THE COMPILER REPORT

After the application is compiled into its .HEX file for downloading, the compiler generates a report which can be viewed by any text editing program. The report is described more thoroughly in the Section X, Page x-x Setting the Run Controls.

To view the report file associated with an application:
1. Click on the **Tools** menu.
2. Choose **View Report**.

The PGK CAA uses Windows Write™ to display the report. The report can be viewed on the screen or printed from Write to be left with the module in the wayside case.

SEARCH AND REPLACE

The PGK CAA includes a Search and Replace function to find all instances of a particular parameter name. A new name can also be specified with which to replace the original.

To invoke the Search and Replace function, click the **Search** button on the toolbar. The *Search* window is displayed (see Figure 7-2).

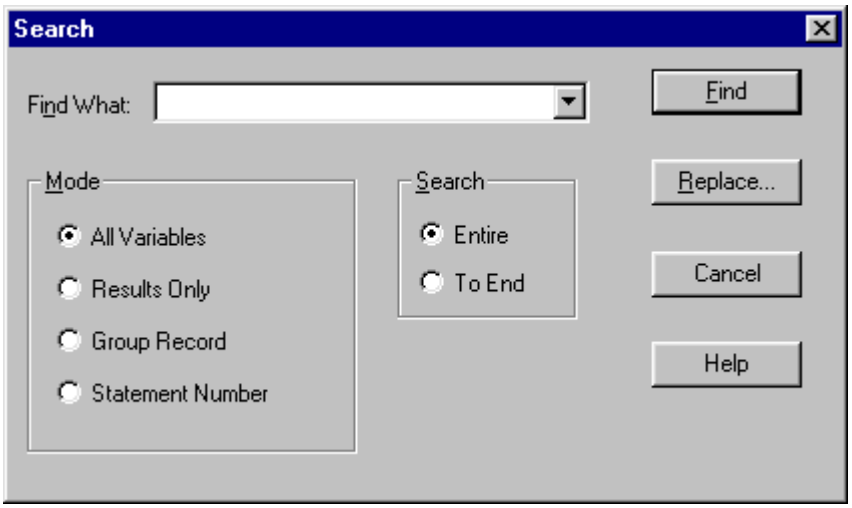

Figure 7-2. Search Window

To perform the replace function, click on the **Replace** button. The *Replace* window appears (see Figure 7-3).

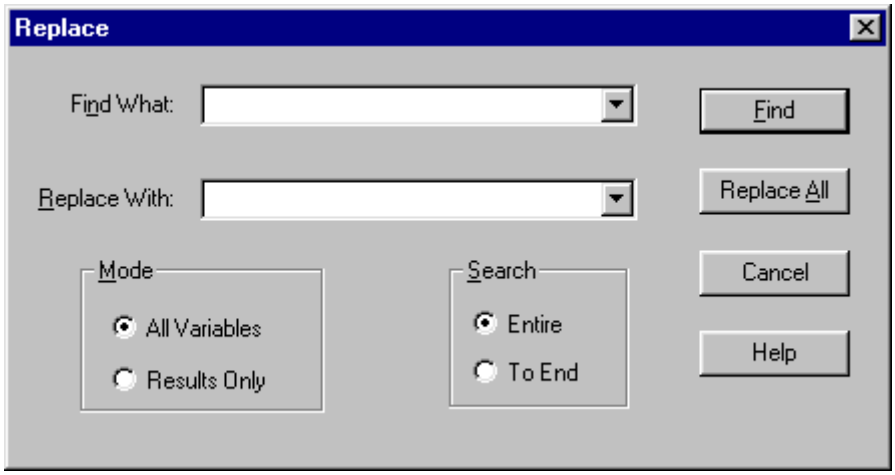

Figure 7-3. Replace Window

In both cases,

1. Choose the Mode for which to search.
2. Click on the down arrow next to Find What and select the item you wish to find.
3. Choose the area of the logic in which to Search.

If simply performing a search function, click on the **Find** button. The first instance is displayed and the *Search* window is replaced with a smaller one (see Figure 7-4). Continue through the application using this window until the desired instance is located.

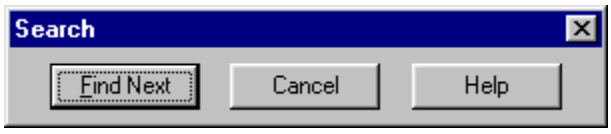

Figure 7-4. Searching

To replace the selection with another:

1. Type the new name of the variable to be exchanged with the selected name.
2. To replace all instances of the selected parameter name, click on the **Replace All** button. To replace selected instances of the name, click on the **Find** button. The first instance is displayed and the *Replace* window is modified with a smaller one (see Figure 7-5.).

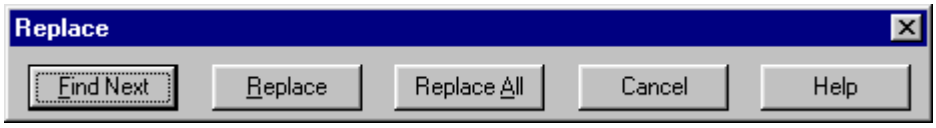

Figure 7-5. Replacing

To skip and NOT replace the current instance, click on the **Find Next** button.
To replace the current instance, click on the **Replace** button.
To replace all instances, click on the **Replace All** button.
To stop searching, click on the **Cancel** button.

MOVING THROUGH THE LOGIC

The logic is organized into statements. Each equation, group and comment has its own statement number which uniquely identifies it within the application logic. The logic can be navigated quickly in either a forward (toward the end of the logic) or backward (toward the beginning of the logic) direction.

Forward

To move forward through the logic statement-by-statement, click the **Next** toolbar button.

OR

To move forward through the logic in larger increments, press the **<Pg Dn>** key on the keyboard or use the down arrow on the scroll bars.

Backward

To move backward through the logic statement-by-statement, click the **Previous** toolbar button.

OR

To move backward through the logic in larger increments, press the **<Pg Up>** key on the keyboard or use the up arrow on the scroll bars.

SECTION 8

CONFIGURING THE CAA

THE TOOLBAR

To hide the toolbar:
1. Click on the **Configure** menu.
2. Choose **Environment**.
3. Click on the box next to Toolbar so that it is empty (see Figure 8-1).
4. Click on the **OK** button.

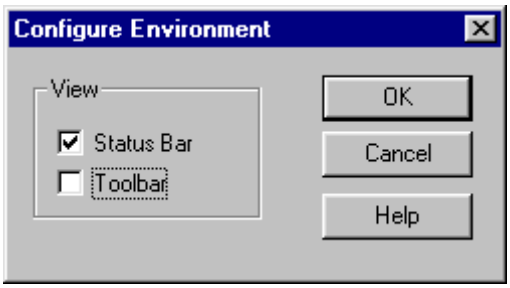

Figure 8-1. Hiding the Toolbar.

The toolbar can be redisplayed in the same way it was disabled. CHECK the Toolbar box to display it and then click on the **OK** button.

THE STATUS BAR

The status bar appears along the bottom of the PGK CAA window. It displays help information and the status of the **<Caps Lock>**, **<Num Lock>** and **<Scroll Lock>** keys.

To hide the status bar:
1. Click on the **Configure** menu.
2. Choose **Environment**.
3. Click on the box next to Status Bar so that it is empty (see Figure 8-2).
4. Click on the **OK** button.

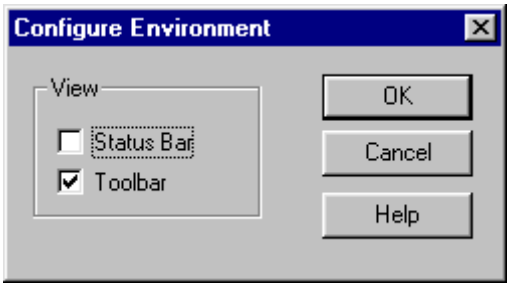

Figure 8-2. Hiding the Status Bar

The status bar can be redisplayed in the same way it was disabled. CHECK the Status Bar box to display it and then click on the **OK** button.

CHANGING THE DISPLAY FONT

By default, the PGK CAA uses the system font to display both configuration and logic data. The font type and size can be modified to user preferences.

To change the font setting:
1. Click on the **Configure** menu.
2. Choose **Font**.

Select the desired font. That font then becomes the default value.

LOGIC FORMATS

Section 5 Creating an Application uses the drop-line logic format for its examples. Logic can also be displayed in straight-line or ladder format, and can be changed at any time during the development process.

To change the logic format:
1. Click on the **Tools** menu.
2. Drag the mouse pointer down to **Symbols**.
3. Click on the desired format.

Equations (2) and (3) from Section 5 Creating an Application are shown below in Ladder Logic (see Figure 8-3) and Straight Line Formats (see Figure 8-4).

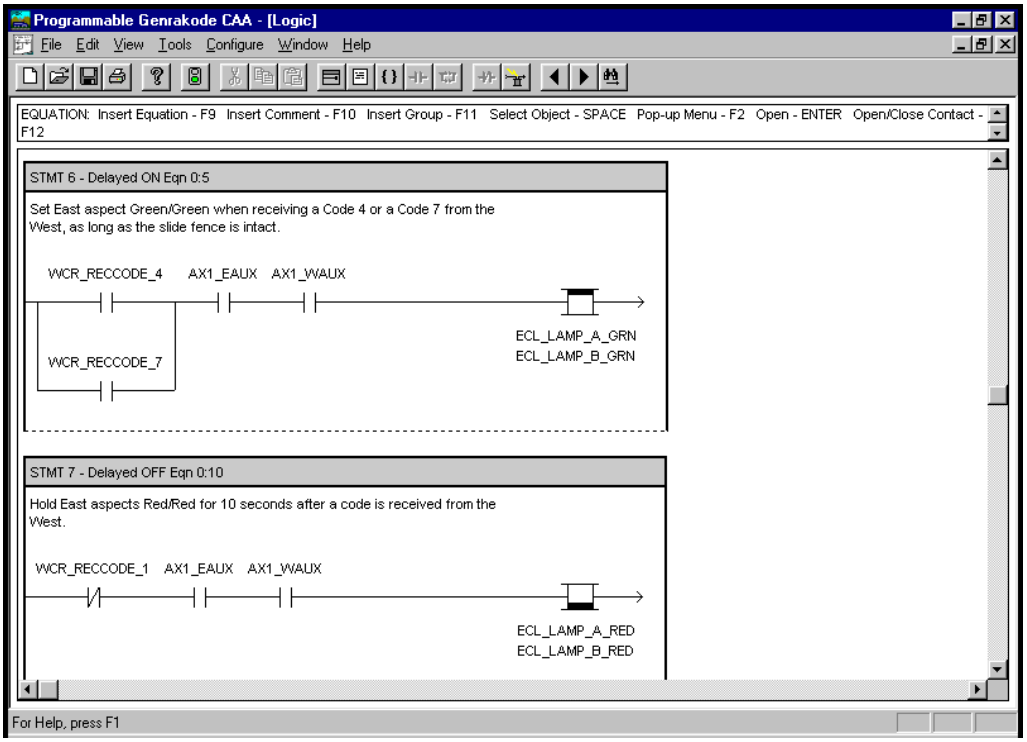
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
EQUATION: Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2 Open - ENTER Open/Close Contact - F12
STMT 6 - Delayed ON Eqn 0:5
Set East aspect Green/Green when receiving a Code 4 or a Code 7 from the West, as long as the slide fence is intact.
WCR_RECCODE_4
AX1_EAUX
AX1_WAUX
WCR_RECCODE_7
ECL_LAMP_A_GRN
ECL_LAMP_B_GRN
STMT 7 - Delayed OFF Eqn 0:10
Hold East aspects Red/Red for 10 seconds after a code is received from the West.
WCR_RECCODE_1
AX1_EAUX
AX1_WAUX
ECL_LAMP_A_RED
ECL_LAMP_B_RED
For Help, press F1

Figure 8-3. Ladder Logic Format

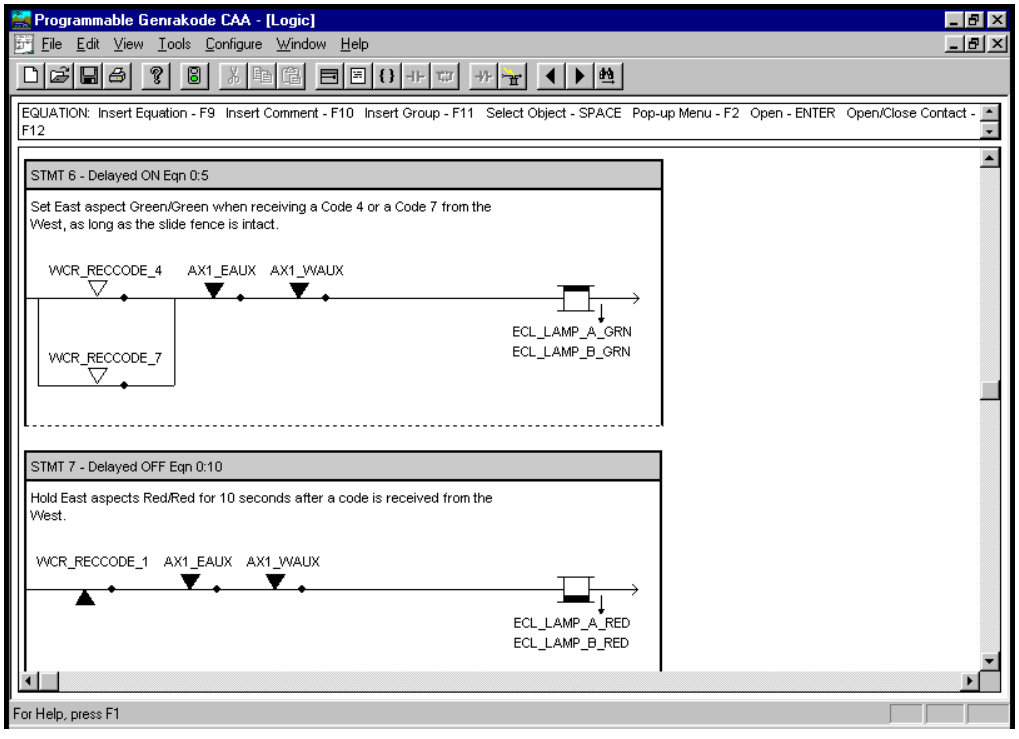
Programmable Genrakode CAA - [Logic]
File Edit View Tools Configure Window Help
EQUATION: Insert Equation - F9 Insert Comment - F10 Insert Group - F11 Select Object - SPACE Pop-up Menu - F2 Open - ENTER Open/Close Contact - F12
STMT 6 - Delayed ON Eqn 0:5
Set East aspect Green/Green when receiving a Code 4 or a Code 7 from the West, as long as the slide fence is intact.
WCR_RECCODE_4
AX1_EAUX
AX1_WAUX
WCR_RECCODE_7
ECL_LAMP_A_GRN
ECL_LAMP_B_GRN
STMT 7 - Delayed OFF Eqn 0:10
Hold East aspects Red/Red for 10 seconds after a code is received from the West.
WCR_RECCODE_1
AX1_EAUX
AX1_WAUX
ECL_LAMP_A_RED
ECL_LAMP_B_RED
For Help, press F1

Figure 8-4. Straight Line Format

PARAMETER NAMES

The names associated with the elements and equation results in the examples are chosen from the list of default parameters available. If a different naming convention is desired, it is possible to customize the parameter names.

To change the parameter names for an application (see Figure 8-5):

1. Click on the **Tools** menu.
2. Drag the mouse pointer down to **Parameter Names**.
3. Drag the mouse pointer to the Genrakode™ board name containing the parameter name to be changed.
4. Click on the direction of the parameter name to be modified.

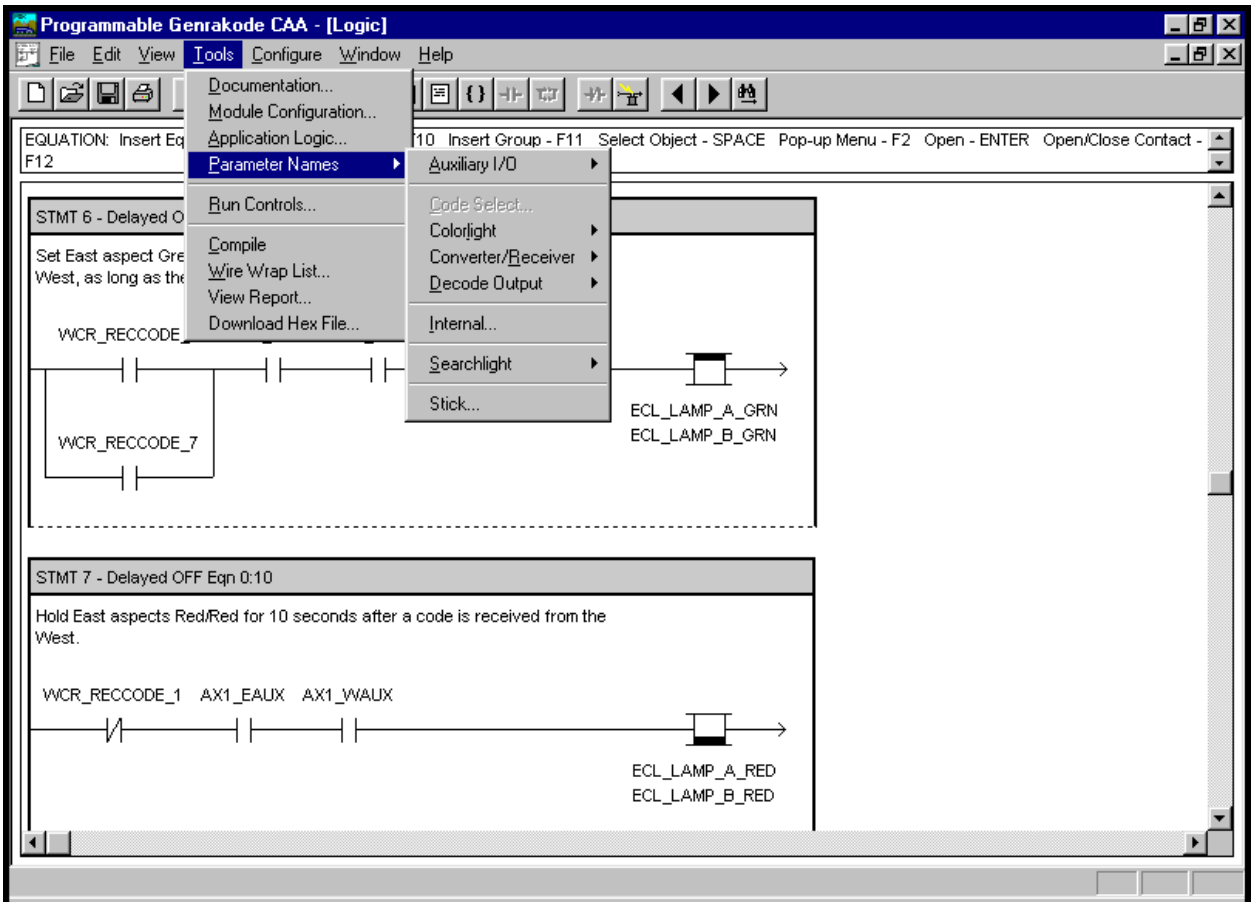

Figure 8-5. Modifying Parameter Name

A *Parameters* window appears (see Figure 8-6). Change the parameters to correspond to the desired naming convention. When done, click on the **OK** button.

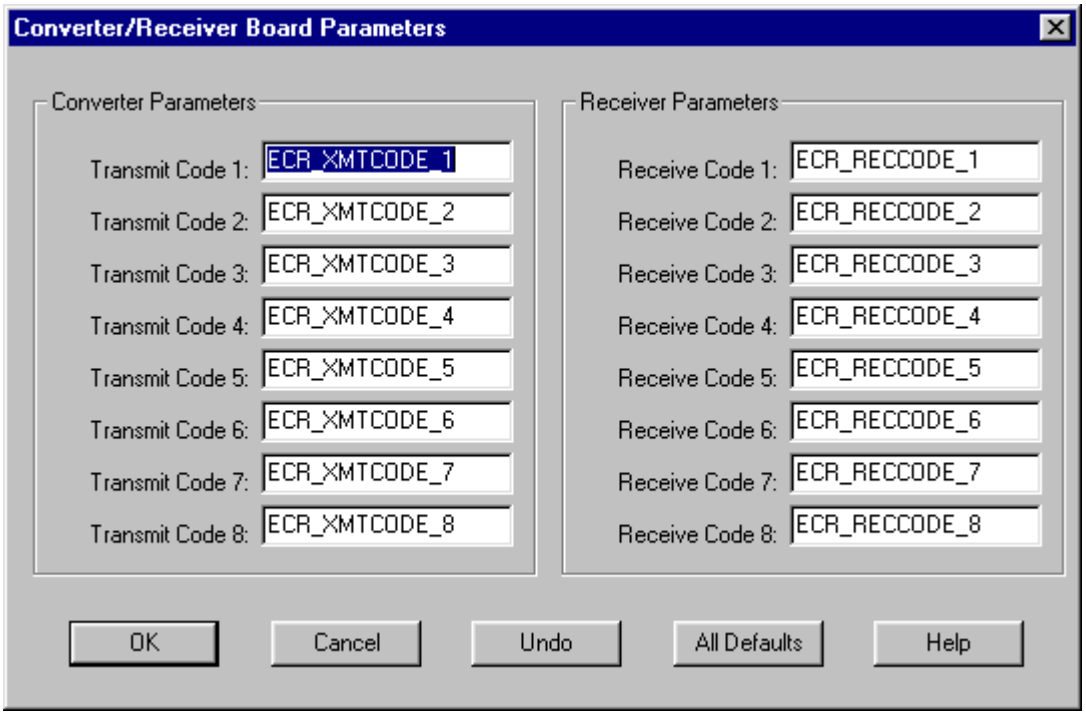

Figure 8-6. Sample Parameters Window

The default parameter names cannot be permanently changed. To avoid having to customize the parameters every time a new application is created, do the following once for common module configurations:

1. Create a new application with the appropriate configuration settings, and no logic.
2. Modify the parameter names as desired.
3. Save this application with an appropriate name. This is now a template for future applications.

When you want to create an application with the modified parameter names, do the following:

1. Open the template application file for the correct module configuration.
2. Click on the **File** menu and choose **Save As** to create a working copy of the template application with another name.
3. Complete the application in this new file, leaving the template (the original, empty file) unaltered to be used again in the same way.

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SECTION 9

BASIC WINDOWS TERMS AND FUNCTIONS

COMMON WINDOWS TERMS

Click: Push down on the LEFT mouse button.
Double click: Click twice rapidly on the LEFT mouse button.
Right click: Push down on the RIGHT mouse button.

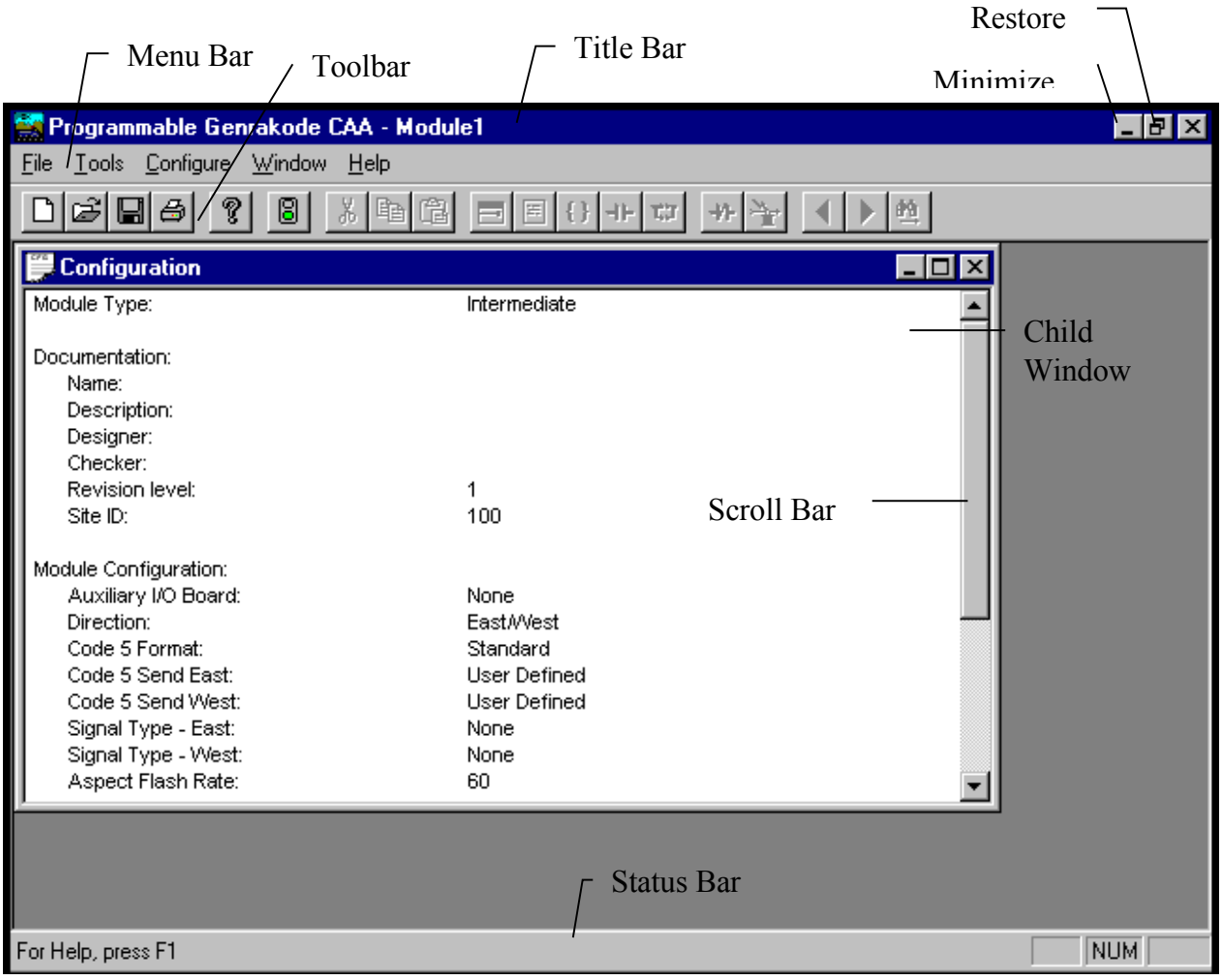

Figure 9-1. Basic Window Parts

Different parts of a window have different names. The common parts of a window which are referred to in this document are displayed in Figure 9-1.

COMMON WINDOW FUNCTIONS

Logic is written based upon building blocks called "objects". The logic objects are comments, groups, equations, elements and branches. Although they play different roles, different objects can be manipulated in the similar ways. Available functions are listed below.

Cutting an Object

	OR	OR	OR
1. Click on the ***object***. 2. Click the **Cut** toolbar button. 	1. Click on the ***object***. 2. Click on the **Edit** menu and choose **Cut**.	1. Click on the ***object***. 2. Press **<Ctrl> + X**.	1. Right click on the ***object***. 2. Choose **Cut *Object*** from the pop-up menu.

The object is removed from the logic and placed on the Windows ***Clipboard***.

Copying an Object

	OR	OR	OR
1. Click on the ***object***. 2. Click the **Copy** toolbar button. 	1. Click on the ***object***. 2. Click on the **Edit** menu and choose **Copy**.	1. Click on the ***object***. 2. Press **<Ctrl> + C**.	1. Right click on the ***object***. 2. Choose **Copy *Object*** from the pop-up menu.

The object remains in the logic and a copy is placed on the Windows ***Clipboard***.

Pasting an Object

	OR	OR	OR
1. Click in the *Logic* window where the ***Clipboard*** contents are to be placed.	1. Click in the *Logic* window where the ***Clipboard*** contents are to be placed.	1. Click in the *Logic* window where the ***Clipboard*** contents are to be placed.	1. Right click in the *Logic* window where the ***Clipboard*** contents are to be placed.
2. Click the **Paste** toolbar button.	2. Click on the **Edit** menu and choose **Paste**.	2. Press **<Ctrl> + V**.	2. Choose **Paste *Object*** from the pop-up menu.

The object appears in the logic at the location of the cursor.

Deleting an Object

	OR	OR
1. Click on the ***object***.	1. Click on the ***object***.	1. Right click on the *object*.
2. Click on the **Edit** menu and choose **Delete**.	2. Press the <**Del**> key.	2. Choose **Delete *Object*** from the pop-up menu.

The object is removed from the logic.

GETTING HELP

PGK CAA provides on-line, context-sensitive help. To obtain help on the current process or active window, press <**F1**>.

Help Menu

The main Help topics appear in the Help Table of Contents.

To display the table of contents:

	OR
Click the **Help** button on the toolbar	Click on the **Help** menu and choose **Contents**.

Search

Help can also be obtained on a specific topic.
1. Click on the **Help** menu and choose **Search**.
2. Type the name of the search topic.

Using Help

For those new to Windows Help systems, instructions are provided on how to navigate **Help**. To access this, click on the **Help** menu and choose **Using Help**.

Tutorial

If you are new to the PGK CAA, we recommend that you first run the tutorial. It will quickly show you the commands and windows necessary to create and download an application. To access the tutorial:
1. Click on the **Help** menu and choose **Tutorial**.
2. Follow the instructions provided.

Status Bar Help

The status bar along the bottom of the *Programmable Genrakode CAA* window displays help information on toolbar buttons and menu options. This information is a one-line description of the functionality of the option.

Buttons

Move the mouse pointer over a button. A few seconds later, a “tool tip” (small yellow tag containing a brief description of the button) appears. The button's function is also displayed in more detail in the status bar.

Menus

Click and hold down on the menu option. Its function is displayed in the status bar.

MANIPULATING CHILD WINDOWS

There are several windows that appear inside the main *Programmable Genrakode CAA* window. These windows are called ***child windows***.

Organizing

When working with several ***child windows,*** it can become difficult to keep track of what is in each window and where it is. Microsoft Windows provides several functions to keep the child windows organized.

Minimizing

This option shrinks the window down to an ***icon***. This allows the window to be kept open while occupying a minimal amount of physical monitor space. To minimize a window, press the **Minimize** button (a down-arrow for Windows 3.1, a line for Windows 95/NT) on the window's title bar. To restore the window, double click on the icon created during the minimize.

Cascading

This option arranges the windows in an overlapping fashion such that only the title bar of the bottom windows are visible. The most recently used windows are on top. To cascade the ***child windows***, click on the **Window** menu and choose **Cascade**.

Tiling

This options shrinks the windows and arranges them in a grid pattern. No window will be on top of another. To tile the child windows, click on the **Window** menu and choose **Tile**.

MAKING A WINDOW ACTIVE

The ***active window*** is the window which is in the foreground of the PGK CAA workspace (its title bar is highlighted). The PGK CAA keeps track of all windows which are currently open. These appear in a numbered list under the **Window** menu. Any open window can be made the active window.

If the window is visible, click on it with the LEFT mouse button.
If a window is open but completely hidden by another window, click on the **Window** menu and choose the name of the window.

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SECTION 10

REFERENCE

EDITING SHORTCUT KEYS

To use the "Menu Access" functions listed in the table, note that the first word listed is the menu name, the second is the choice from the menu. The pop-up menu is accessed by clicking with the RIGHT mouse button in the associated "Click On" area.

To use the "Shortcut Key" functions listed in the table, make sure the cursor is positioned stated in the "Click On" location and then press the shortcut key.

Table 10-1. Shortcut Key Functions

Function	***Click On***	***Menu Access***	***Shortcut Key***
Help		Help / Contents	F1
Insert Equation	Empty space in the *Logic* window	Edit / Insert Equation Pop-up / Insert Equation	F9
Insert Comment	Empty space in the *Logic* window	Edit / Insert Comment Pop-up / Insert Comment	F10
Insert Group	Empty space in the *Logic* window	Edit / Insert Group Pop-up / Insert Grp Rec	F11
Select Object	*Object* (with LEFT button)		Move cursor over Object, press Space
Pop-up Menu	*Object* (with RIGHT button)		Move cursor over Object, press F2
Open	*Object*	Edit / Open Pop-up / Open *Object*	Enter
Cut	*Object*	Edit / Cut Pop-up / Cut *Object*	Ctrl + X
Copy	*Object*	Edit / Copy Pop-up / Copy *Object*	Ctrl + C

Table 10-1. Shortcut Key Functions (cont.)

Function	*Click On*	*Menu Access*	*Shortcut Key*
Paste	*Object*	Edit / Paste Pop-up / Paste *Object*	Ctrl + V
Delete	*Object*	Edit / Delete Pop-up / Delete *Object*	Del
Complement	Element	Pop-up / Complement Element	F6
Set Normal State of an Element	Element	Pop-up / Toggle Normal State	F12
Insert Element	Branch	Pop-up / Insert Element	F3
Insert Branch	Branch	Pop-up / Insert Branch	F4

NOTE: An *Object* can be a comment, group, equation, branch or element.

THE TOOLBAR

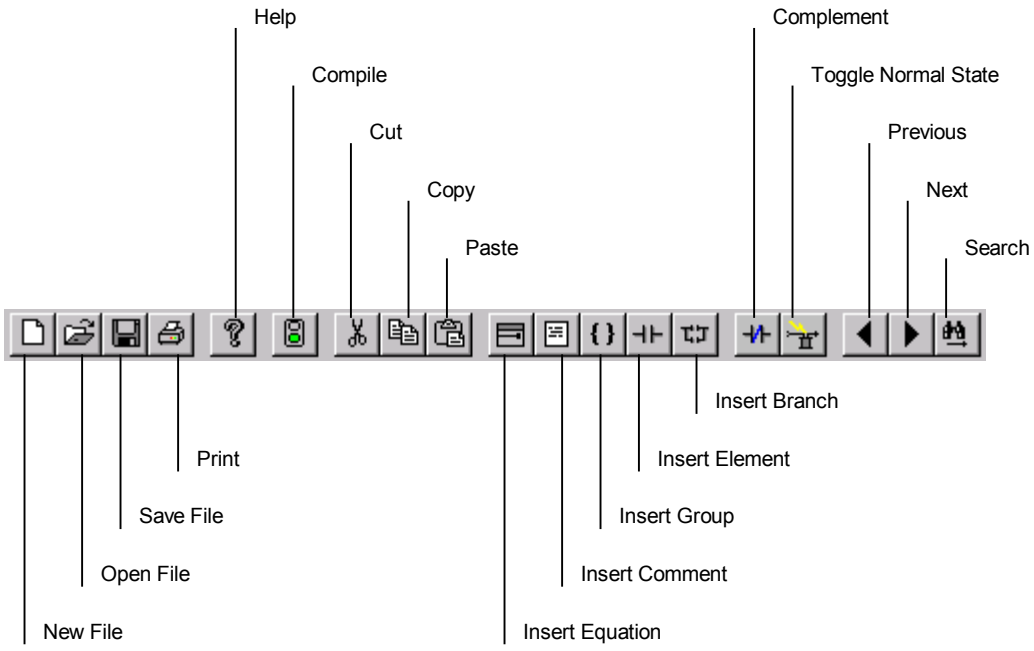

Figure 10-1. Toolbar

GLOSSARY

Active Window ……... The window which is in the foreground of the PGK CAA workspace.

Branch ……..…….….. The application logic model of a possible current path. It is one of the basic building blocks of the logic equations.

Child Window ……..… A window which is created by another window. In the Programmable Genrakode™ CAA the Child Windows are the windows which appear only in the space of the main window (e.g. Configuration, Compile, and Logic).

Clipboard …….... A location common to all Windows applications. Text and graphics can be cut or copied to the Clipboard from a Windows application supporting it. The copied/cut information can then be pasted from the Clipboard to any other supporting Windows application.

Comment ……..…… A text description of the application or equation. It serves only to explain the logic. It has no effect on the compilation or performance of the application.

Compiler ……..… The PGK CAA tool which translates the application (.PGK) file into the hexadecimal format recognized by the PGK CPU board (.HEX).

Current Application …... The application whose Configuration, Logic or Compile window is in the foreground of the PGK CAA workspace (i.e. the active window).

Delayed OFF Equation .. The output goes ON, or TRUE as soon as the equation result is TRUE and goes OFF, or FALSE a specified amount of time after the result is FALSE.

Delayed ON Equation .... The output goes ON, or TRUE a specified amount of time after the equation result is TRUE and goes OFF, or FALSE as soon as the result is FALSE.

Download …….... The transfer of the compiled application from the development computer to the PGK CPU board.

Element ……..….. The application logic model of a relay. It is associated with an input variable. If the input variable is ON, or TRUE, current will flow through the logic element. If the associated variable is OFF, or FALSE, the current flow will stop at the relay. It is one of the basic building blocks of the logic equations.

Equation ……..…… A series of ***elements***, combined in various ***branches*** to create a pattern

through which energy attempts to flow. The result of the equation is ON, or TRUE, if energy can flow through any ***branch***. The result is OFF, or FALSE, if energy is unable to flow.

Group …….. A set of related ***equations*** defined by the application designer. The group serves only to organize the logic. It has no effect on the compilation or functionality of the application.

Icon ……..…… A small picture that represents a program or minimized window.

Normal Equation …..….. The output goes ON, or TRUE, as soon as the equation result is TRUE and goes OFF, or FALSE, as soon as the result is FALSE.

Object …….. Any logic building block upon which editing functions can be performed. It can be an ***equation***, ***comment***, ***group***, ***branch*** or ***element***.

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